POPULAR Computing WEEKLY

35p 1-7 September 1983 Vol 2 No 35

This Week

★ STAR GAME ★
Damsel in distress on Spectrum
See page 10.

News Desk

Electron launched . . . at last

THE Electron micro computer has at last been officially launched.

The new £199 machine originally announced over 16 months ago was delayed because of complications with the design of its giant ULA chip which, it is hoped, will deter hardware pirates from producing 'rotten' Electrons. Says Acorn's joint managing director Hermann Hauser: "It is by far the largest custom chip anyone has put in a micro with over 2,400 gates — I defy anyone to copy that chip."

Acorn hopes to sell over 100,000 machines by February next year. At present, the Electron is being manufactured in Malaysia but within the next six weeks, Acorn hopes to conclude agreements

Continued on page 5

For whom the bell tolls

FOR the first time a UK court has granted an arcade machine manufacturer an injunction restraining a home computer software house from selling a program which it claims infringes its copyright.

Century Electronics, Europe's largest arcade originator, was granted an ex-parte injunction on August 13 against the Leeds-based software house Superior Software. Superior Software has been advertising a game called *Hunchback*, which Century claims is an infringement of the visual image copyright in its *Hunch back* arcade game launched at the Amusement Trade Exhibition in January.

The decision taken in the high court last week had far-reaching implications. It is the first time that an English court has granted an injunction on the basis of cinematographic copyright in the visual image of an arcade game.

Up until this decision the only similar case was the US

Continued on page 5

Classified

Computer Swap 01-734 3454
Free readers entries to buy or sell a computer.
Ring 01-734 3454 and give us the details

FOUR VIC20 CARTRIDGES Sell for £6 each or swap for Vic Submarine Commander. Tel Stevenage (0438) 811634 after 7 pm

VIC20 OWNERS! Our Rampack Adapter allows standard software to be run on your expanded system without removing the Rampack. Simply switch your extra memory on or off as needed. Prevents wear to computer Rampack terminals. £12.45 inc. p&p. L W

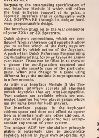
Stones & Co Unit 2 Rosling Trading Estate London Road Barking Essex Tel 01-591 2900

SIX ATARI VCS cartridges for sale, all best titles, worth £150 will sell for £15 each or the lot for £90. Tel Lower Peover 2095 (private sale)

Continued on page 40

AGF PROGRAMMABLE JOYSTICK INTERFACE for Spectrum or ZX81

ONLY 32·95 +£1·00pp



ABOUT OUR PROGRAMMABLE INTERFACE

Surpassing the outstanding specification of our Interface Module II which still offers the best software support at its price, a Joystick Interface that is compatible with ALL SOFTWARE through its unique hardware programmable design.

The interface plugs on to the rear connector of your ZX81 or ZX Spectrum.

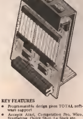
Quick clip-on connections, which are configured from a reference card supplied, allow you to define which of the forty keys are simulated by which action of the Joystick. A pack of ten Quick Reference Programming Cards makes setting for your favourite games even easier. These can be filled in to show at a glance the configuration required and stored in the cassette case of the particular game. When you change to a game using different keys the module is re-programmed in a few seconds.

As with our Interface Module II the Programmable Interface accepts all standard switch Joysticks that are Atari-compatible. Two sockets are available which are connected together for two player games which use the same keys for both players.

The interface resides in the keyboard address space and does not affect its operation or interface with any other add-ons. A rear extension edge connector will accommodate expansion of your system.

The unique AGF key simulation principle makes it extremely easy to incorporate Joystick action in your own programs. All eight directions and fire are read by simple BASIC

With every order comes a free demonstration program called 'Video Graffiti' plus a full set of instructions.



KEY FEATURES

- Programmable design gives TOTAL software support
- Accepts Atari, Competition Pro, Wico, Starfighter, Quick Shot, Le Stick etc.
- Rear extension connector for all other add-ons.
- Free demo program and instructions.

PACKAGE CONTENTS SUPPLIED

- Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self adhesive programming chart detailing how to define which key is simulated by UP DOWN, LEFT, RIGHT and FIRE. This can be fixed on to the case of your computer or if preferred the protective backing can be left on. The chart is made of a very durable reverse printed plastic and is extremely easy to read.
- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements. The card allows you to mark the configuration in an easy to read fashion with space to record the software title and company name.
- Video Graffiti demonstration program which is written totally in BASIC to illustrate how all eight directions and fire can be read. This is also a useful high resolution drawing program
- 12 months guarantee and full written instructions.

JOYSTICKS

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FOR USE WITH OUR INTERFACE Module or VIC 20, Commodore 64, Atari VCS, Atari 400, Atari 800

If you require extra Joysticks for our original interface module mark order 'OLD' Joysticks

ONLY £7 54 inc VAT + P&P

FROM MR/MRS/MISS

ADDRESS

SEND C.W.O. (NO STAMP NEEDED) TO A.G.F. HARDWARE DEPT PCW

FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR

QTY	ITEM	ITEM PRICE	TOTAL
	PROGRAMMABLE INTERFACE	33.95	
	JOYSTICK(S)	7.54	
	PACK(S) QUICK REFERENCE CARDS	1.00	
ONE	VIDEO GRAFFITI	FREE	
	ZX81 ☐ ZX SPECTRUM ☐ Please tick	FINAL TOTAL	

DEALER ENQUIRIES WELCOME *EXPORT PRICES ON APPLICATION*



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How to submit articles

Articles which are submitted for publication should not be more than 3 000 words long The articles and any accompanying programs should be original It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted

All submissions should be typed and a double space should be left between each line Please leave wide margins

Programs should whenever possible be computer printed

We cannot guarantee to return every submitted article or program so please keep a copy If you want to have your own program returned you must include a stamped addressed envelope

Accuracy

Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work

This Week

Editorial

The demise of Grundy Business Systems (*PCW* 25-31 August), manufacturer of the NewBrain micro is an indication of the fierce competition faced by each of Britain's micro makers

This Christmas may well be the last 'micro boom This is not to say that micro sales next year will suddenly plummet, rather that they are likely to flatten out The sales curve, which seems to have been growing exponentially for the past three years, may finally reach a plateau

Given a market which is no longer expanding at a phenomenal rate, the question of market share becomes increasingly important Sinclair and Commodore are undoubtedly the big two as far as the home market is concerned Acorn, as long as it retains its links with the BBC, should be assured of a share in the market

Other manufacturers, however, from Atari and Texas Instruments to Dragon, Camputers and Mattel will be competing to grab as large a share of the market as possible This could precipitate a further round of price cuts, whether or not the manufacturers can afford them

The days when you could launch a micro of almost any description, stand back and wait for the money to flow in, are over The fight is now on to see which companies will still be around in five years time

Next Thursday

Travel across deep space avoiding the asteroids and meteors, but collect as much cargo and fuel as possible. Astro-Transporter, next week s star game for the Vic20 by Benedict MacCarty

Electron challenges elder brother

Continued from page 1

to manufacture in the UK — possibly with AB Electronics in South Wales

It is our intention to dominate the £200 price range with the Electron said Hermann as the same way as we have done in the £400 range with the BBC machine He said that he expected the Electron price to remain at £199 throughout 1984

Initial software support for the Electron consists of 12 titles converted from the BBC *Creative Graphics Graphs and Charts Personal Money Management Lisp Forth Starship Command Monsters Chess Tree of Knowledge Draughts and Reversi Snapper* and *Meteors*

The aim is to convert all of the existing BBC programs for the Electron David Johnson-Davis Acornsoft's managing director expects it to be at least six months before the Electron software catches up with the BBC material

A range of hardware add-on units is planned for the Electron — priced between £30 and £100

The first of these will be a teletext adaptor, available before Christmas for around £100

Next at the start of 1984 comes a unit giving the Electron a Centronics printer interface a joystick/paddle port and the ability to take Rom cartridges The unit will have two sideways Rom ports into which it will be possible to plug either Rom or Ram cartridges of up to 240K capacity in 16K steps each piggy-backed off the next The first Rom will be an enhanced version of *Snapper* to appear in early 1984

Following that comes the third interface unit giving the Electron discs and Econet

Acorn is also to sell a home control system for the Electron to operate household electrical appliances Like the unit recently announced for the Mattel Aquarius it will be a development of the BSR system

● Acorn took the opportunity of the Electron launch to give some indication of future products

The Acorn Business Machine (ABM) a Z80-based CP/M machine with built-in display and discs is planned for early 1984 A Computer Aided Design terminal is planned for 1985 and a communications terminal and a voice recognition and control system are also underway

IBM Peanut to hit Adam

IT now seems likely that IBM will launch its down-market version of the IBM PC — the Peanut — in the US in late September or early October

The machine is expected to cost around the $800 and could cause some problems for the Coleco Adam broadly in the same price band

First shipments of the Adam computer star of the Chicago CES Show have been delayed Originally scheduled for August 31 the first Adams are now planned for early September The delay is blamed on difficulties in gaining FCC approval in the US Undaunted Coleco still hope to ship 500 000 machines before Christmas

It is now doubtful that any Adams will find their way to the UK in 1983

Commodore steams ahead

COMMODORE remains one of the few successful US computer manufacturers

In complete contrast to Atari and Texas, both of whom have suffered enormous recent financial losses Commodore has gone steaming ahead by announcing fourth-quarter and full-year earnings and sales up by a factor of two

For the full-year Commodore reported profits of $91 7m Sales for the year were up from $304 5m to $681 2m

Arcade injunction

Continued from page 1

one in which Atari won a legal battle with Philips *Munchman* game which Atari claimed was a *Pac-man* rip-off Atari were awarded the case on the basis of the audio-visual content of the game using the cinematographic protection laws

'We have taken the action' said Century's managing director David Jones simply because we are protecting something that we have developed ourselves

There has been an awful lot of waffle about copyright not existing in computer games What we are saying is — OK there may be no rules but each time somebody copies one of our games we will take them right down the road to the point where we get some rules

The days when a home computer software manufacturer can copy and ride on the back of an arcade success are numbered

Richard Hanson managing director of Superior Software confirmed that his company had been served with the Century injunction "I got about 20 minutes notice that it was coming

We certainly do not admit to any extent that Century had a case Whether we fight or not is another matter — the amount of money involved in litigation to fight it may well make it unfavourable for us to do so

'We would be very happy if it became a general ruling that people could not make arcade game copies But if we were to say that we were going to stop using arcade-type themes then I think that would put us in a disadvantageous position with regard to our home computer software competitors To be competitive in the home computing field you have to produce arcade-type games — even if there is a possibility of some risk

● Superior Software are not the only company to have been approached by Century Mr Micro produces a game called *Hunchy* Century has served Mr Micro with notice that it is to seek an injunction to stop sales of *Hunchy*

Jim Gregory managing director of Mr Micro has agreed to withdraw the title but vigorously denies that his game is an infringement of Century's copyright "There is no question of passing off Our programmer has seen the Century arcade game but we have changed the graphics the rules of the game and the scenario The only tenuous link between the two games is that the plot for both is based on the same Victor Hugo novel and both feature a hunch-back person negotiating various obstacles To fight the case would have cost us several thousand pounds Very few companies can afford that kind of money — we simply couldn't afford to make our claims in court

Arcade/adventure twins

PHOENIX Software, the new company formed by Gerry Rose (see *Popular Computing Weekly* August 18) has announced its game plan

A range of twin-cassette titles will be sold each consisting of an arcade game and an adventure game In order to begin the adventure it is necessary to master the arcade game — picking up clues and the vital loading code

Six titles are presently under way *Mission Moonbase Dodge City* and *Mission Earth Centre* (all 48K Spectrum) *O Level Caper* (Vic20) and *Airport Yesterday* and *Lunar Rescue* (Dragon 32)

Each twin-cassette pack will sell for £9 99

TI drops price

FROM September 1 the price of the TI99/4A computer in the UK will be chopped even lower bringing the machine down to £99 95

End of a saga

Popular Computing Week*ly has now received the two Microdrives and Interface Is it ordered on July 29*

Time taken to fulfill order 28 days exactly

LETTERS

Scrabble warning

This is a warning to families with young or not so young children who have bought (or are considering buying) Psion's *Scrabble*

We were playing it the other night my wife the Spectrum and me It came to the Spectrum's turn Spectrum thinking' it said — Fart was the word on the screen My wife and I fell about in hysterics

I wonder what other words this program has in its vocabulary? May I congratulate Psion on the best program yet for the Spectrum

Steve Freedman
22 Larchwood Close
Collier Row
Romford
Essex

With an 11,000-word vocabulary, I suppose it is not altogether surprising that Psion's *Scrabble* occasionally comes up with an interesting choice of word. If any other readers have been surprised by a *Scrabble* selection, please write in and tell us.

Clear and sharp

Regarding Ian Beardsmore's advice on tuning the ZX81 (*PCW* 11-17 August) I have found a useful method of getting my ZX81 in tune

When my computer's display becomes unclear or when I switch it on, I simply use the *Save* command Just enter *Save* " anything " *Newline* and wait till the black and white lines appear, leave them for a few seconds then press *Break* The display should now be clear and sharp

Mark Letheren
63 Effingham Road
Long Ditton
Surbiton
Surrey KT6 5LA

Constent slating

I read with great disgust the constant slating that Sinclair Basic receives from readers of your and many other publications To such critics I remind them that over 60 per cent of the micros on this planet use this excellent dialect By my definition "standard" means the most common and widely used Does this not make Sinclair's non standard Basic in fact *the* standard?

P Crawley
Bedstone College
Bucknell
Salop SY7 0BG

I fear that it is too late for any version of Basic to be adopted as the standard The various micro manufacturers have too much tied up in their own systems to agree to accept someone else's version of Basic Computer languages, as with their human counterparts, seem destined to remain both varied and incompatible

Significant omission

Correcting a tiny but significant omission from two of the demo routines given in the first of Peter Bartley's useful new series on Vic programming (*PCW* 18-24 August) will allow them both to Run correctly

In the program tagged Figure 1 line 50 should read

```
50 PRINT MID$ (A$ A B)
```

Similarly, the first statement in line 40 of Figure 2 should read

```
40 B$=MID$(A$ A 1)
```

John Ransley
12 Tamworth Road
Hove
East Sussex BN3 5FJ

Instructive alternative

Owners of Vic20 machines may be interested in the following program lines It was devised when entering Bryan Skinner's *Database* routine (*PCW* 16-22 June) when I found that line 330 just would not work (no *Instr* facility on Vic20) One alternative is to simply enter

```
330 IF TA$ = AR$(R CN) THEN GO
    SUB 440
```

However as Bryan rightly states this is a line that provides direct matching and will not return boat from boatbuilder etc The following lines examine the string to look for and then examine each array to determine whether the requested string forms any part of it

```
330  GO SUB 2000
340  NEXT R
2000 N = LEN(TA$)
2010 M = LEN(AR$(R CN))
2020 FOR P = 1 TO M
2030 IF TA$ = MID$(AR$(R CN)P N)
     THEN 2050
2040 NEXT P RETURN
2050 TF = TF + 1 GO SUB 450
     RETURN
```

Tip This program takes up just under 2K If you intend storing a lot of data then it is best either to write data to a tape file or use a memory expansion of 3K (at least)

John Hughes
1 Wilson Road
Alton
Hants GU34 2SR

Charecter transfer

Now that adventure games are available where a character's gained experience can be saved and reloaded for a replay, it is time for conventions to be established for reusing characters in different games

Publishing the loading codes would allow the user's character to be transferred between different machines and enable programmers to write the relevant saving codes

I would like to hear from anyone interested in this whether they be programmers software houses distributors, magazine publishers or users

Chris Whitehouse
384 Queensbridge Road
Dalston
London E8 3AR

Well now, that is an interesting idea It should certainly be possible for software houses to enable characters to be transferred from one game in a series to another, though it may be more difficult to transfer characters between different software houses Anyone interested in pursuing this idea further should write to Chris at the above address

A question of scrolling

One of the problems with the Lynx is the lack of scrolling This can be a disadvantage in a text-type program when you might want more than one message to appear on the screen at a time

The following routine allows the last two or more messages to appear at the same time, depending on the number you want and the size of each message

First dimension a small array (*M*) with the number of dimensions being the number of messages you want to appear at a time The array is initialised with all elements at zero All messages should be in a procedure and referenced by a number The procedure is as follows

```
5000 DEFPROC MESSAGE
5010 M(0) = M(1) M(1) = M(2) M(2)
     = M
5020 CLS
5030 GOSUB 5100 + M(0)*30
5040 GOSUB 5100 + M(1)*30
5050 GOSUB 5100 + M(2)*30
5060 ENDPROC
5100 PRINT
5110 PRINT
5120 RETURN
5130 PRINT
5140 PRINT "THIS IS MESSAGE NO
     1"
5150 RETURN
5160 PRINT
5170 PRINT "THIS IS MESSAGE NO
     2"
5180 RETURN
```

K Walker
8 Shandon Terrace
Hamilton
Lanarkshire
ML3 9UL

Highest orbit

After playing Silversoft's excellent game *Orbiter* for 51 minutes I scored 254 305 points and reached wave 17 Is this a record?

After wave six, wave seven returns to the planet's surface like wave two but with more pods and green (unmutated) aliens

Philip Crawley
Bedstone College
Bucknell
Salop SY7 0BG

Machine code series

In reply to M Barrett's letter (*PCW* 18-24 August) requesting a machine code series for the Spectrum if he cares to send me £1 and an A4 stamped addressed envelope I can send a copy of the *PCW* series which is first-rate

PS How about some Spectrum star games which have the central figure more than one character high?

W Rowe
671 Staines Road
Bedfont
Middlesex TW14 8PA

Damsel In Distress

A new game for 16K Spectrum by Richard Bartlett

In this program you play the role of a brave knight. And you must rescue the poor 'damsel in distress' who is locked up in a large castle. Be careful though, because not every fairy tale has a happy ending and whether this one has is up to you because there is an evil knight who is in hot pursuit. Full instructions are included in the program.

Program notes

30-40	Assign variables and calls on subroutines for instructions and user graphics
60-61	Level of difficulty
70-170	Set up screen display
210-560	Main loop
210-260	Players move
500-590	Knights move
2000-2070	Player reaches castle
3000-3060	Caught by bad knight
4000-4090	Game over
5000-5050	Kill bad knight
9000-9100	Instructions
9500-9540	Set up user graphics
9600-9700	DATA for user graphics



```
10 REM Damsel in Distress
20 REM © Richard Bartlett 1983
30 BORDER 0: PAPER 0: INK 7: C
LS
35 LET s=0: LET k=3
36 PRINT "Please wait.": RESTO
RE : GO SUB 9500
40 GO SUB 9000: REM Instructio
s
50 BORDER 4: PAPER 4: INK 0: C
LS : BRIGHT 0
60 INPUT "Level 1-9 ? (9 easy)
",l: IF l<1 OR l>9 THEN GO TO 60
61 INPUT "Skill A or B ? (B ea
sy) ",r$: IF r$="B" THEN LET r$=
"b"
70 PRINT AT 0,0;"Level ";l: PR
INT AT 0,16;"Score=";s
80 PRINT AT 1,0;"
 ": FOR i=2 TO
19: PRINT AT i,0;" ";AT i,31;" "
: NEXT i: PRINT "
"
110 FOR i=1 TO l*10+10
120 LET x=INT (RND*18)+2: LET y
=INT (RND*30)+1: PRINT AT x,y; I
NK 0;"": NEXT i
140 PRINT AT 4,24; INK 7;"": P
RINT AT 5,22; INK 7;"": PRINT
AT 6,22; INK 7;""
160 LET y=INT (RND*30)+1: LET x
=18: PRINT AT x,y; INK 7;""
170 LET dx=INT (RND*18)+2: LET
dy=INT (RND*30)+1: PRINT AT dx,d
y; INK 2;""
210 REM Movement
215 IF r$="b" THEN FOR i=1 TO 2
220 LET f=0: LET h=0
230 LET f=f-(INKEY$="7")+(INKEY
$="6")
240 LET h=h-(INKEY$="5")+(INKEY
$="8")
245 IF INKEY$="0" THEN GO SUB 5
000: REM Kill night
250 PRINT AT x,y;" ": IF ATTR (
x+f,y+h)=38 THEN GO TO 2000
260 IF SCREEN$ (x+f,y+h)<>" " T
HEN GO TO 500
270 PRINT AT x,y;" ": LET x=x+f
: LET y=y+h: PRINT AT x,y; INK 7
;""
275 IF r$="b" THEN NEXT i
280 GO TO 500
500 REM Knights move
510 PRINT AT x,y; INK 7;""
520 LET o=0: LET p=0
530 LET o=o-(dy>y)+(dy<y): IF S
CREEN$ (dx,dy+o)<>" " THEN LET o
=0: GO TO 540
535 GO TO 570
540 LET p=p+(dx<x)-(dx>x)
570 IF dx+p=x AND dy+o=y THEN G
O TO 3000
580 IF SCREEN$ (dx+p,dy+o)<>" "
THEN GO TO 210
590 PRINT AT dx,dy;" ": LET dy=
dy+o: LET dx=dx+p: PRINT AT dx,d
y; INK 2;"": GO TO 210
1999 STOP
2000 REM Home
2010 PRINT AT x,y; INK 7;""
2020 FOR i=30 TO 50 STEP 2: BEEP
 .1,i: NEXT i: FOR i=50 TO 30 ST
EP -2: BEEP .1,i: NEXT i
2030 LET s=s+10
2040 PRINT AT x,y;" "
2050 IF l>1 THEN LET l=l-1
2055 FOR i=23 TO 2 STEP -1: PRIN
T AT 7,i+2;" ": PRINT AT 7,i; I
NK 7;"": PAUSE 5: NEXT i
2060 CLS
2070 GO TO 70
2999 STOP
3000 REM Caught by KNIGHT
3010 PRINT AT dx,dy;" ": PRINT A
T dx+p,dy+o; OVER 1;""
3020 PRINT AT dx,dy;" "
3030 FOR i=-30 TO -20 STEP 2: BE
EP .1,i: NEXT i: PAUSE 21: FOR i
=-20 TO -30 STEP -2: BEEP .1,i:
NEXT i: FOR i=0 TO 50 STEP 5: BE
EP .1,i: NEXT i
3040 BORDER 0: PAPER 0: INK 7: C
LS
3050 GO TO 4000
3999 STOP
4000 REM Game over
4010 FOR a=0 TO 21: PRINT AT a,a
; INK 2;"Game Over": PRINT AT 21
-a,a; INK 2;"Game Over": BEEP .1
,a: NEXT a
4020 FOR i=-50 TO 50 STEP 10: BE
EP .1,i: NEXT i: PAUSE 54
4030 CLS
4040 PRINT TAB 10; INK 6;"Game O
ver": TAB 10; INK 6;"---- ----"
4050 PRINT "The Knight has c
aught you and taken you back t
o his dungeon. From which you w
ill never escape. You
managed to recue the Dam
sel ";s/10;" times,which means "
;"you scored ";s;" points."
[redacted] PRINT "Do you want to p
lay again ? Press Y for yes
N for no."
4070 IF INKEY$="Y" OR INKEY$="y"
THEN LET s=0: GO TO 50
4080 IF INKEY$="n" OR INKEY$="N"
THEN GO TO 9500
4090 GO TO 4070
4999 STOP
5000 REM Kill Knight
5010 LET k=k-1: IF k<=0 THEN RET
URN
5020 PRINT AT dx,dy;" "
5030 LET dx=INT (RND*18)+2: LET
dy=INT (RND*30)+1
5035 FOR i=80 TO 30 STEP -5: BEE
P .1,i: NEXT i
5040 PRINT AT dx,dy;""
5050 RETURN
9000 REM Instructions
9010 PRINT AT 1,5; INK 2;"Damsel
in Distress": INK 2;"----
-- --------"
9020 PRINT AT 4,5; INK 2;"© Rich
ard Bartlett 1983"
9030 PRINT AT 6,0;"Collect the
damsel from the castle to sc
ore points. But watch out fo
r the evil knight because he
is out to get you."
9040 PRINT '"Also there are tre
es in your way so you must g
o around them."
9050 PRINT '' INK 5;"PRESS ANY
KEY TO CONTINUE": PAUSE 0
9060 CLS : PRINT AT 2,2;"This is
the castle": PRINT TAB 23
;"": PRINT TAB 23;""
9070 PRINT '"This is the knig
ht ""This is the hero
"
9080 PRINT '"To move the hero
(YOU) "'"use the cursor keys."
9090 PRINT ' INK 0;"N.B. If th
e knight is about to get you
, you can kill him by pressin
g the 0 key.But be careful yo
u can only do this twice."
9100 PRINT ''"Press any key to
start.": PAUSE 0: RETURN
9499 STOP
9500 FOR i=144 TO 160
9510 FOR n=0 TO 7
9520 READ UDG: POKE USR (CHR$ i)
+n,UDG
9530 NEXT n: NEXT i
9540 RETURN
9600 DATA 0,24,60,189,255,126,18
3,165
9610 DATA 0,0,204,204,255,120,12
3,135
9620 DATA 0,0,204,204,255,0,14,1
7
9630 DATA 165,165,165,189,129,1,
1,1
9640 DATA 136,136,136,136,136,13
6,136,255
9650 DATA 145,145,159,120,120,12
0,120,255
9660 DATA 1,1,1,1,1,1,1,255
9670 DATA 24,24,189,90,25,36,36,
36
9680 DATA 24,24,61,90,152,36,66,
66
9690 DATA 231,165,129,66,66,36,3
6,24
9700 DATA 231,255,255,126,126,60
,60,24
9710 DATA 231,255,219,102,90,126
,60,24
9720 DATA 129,129,255,255,129,25
5,255,129
9730 DATA 255,129,255,129,255,12
9,255,129
9740 DATA 0,24,60,126,255,255,24
,24
9750 DATA 24,24,60,90,153,60,126
,24
9760 DATA 24,24,188,90,25,60,120
,36
```

Level 5 Score=0

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Running the gamut

***David Kelly** talks to Taitel, the people who brought you* Space Invaders

Space Invaders — an entire sub-culture unto itself! And the game which lent its name to collectively describe the whole gamut of video games.

Taito originated the game in Japan. Taito (UK) now called Taitel imported the coin-operated machines.

Says Taitel's managing director David Coren: "In the UK everything that has happened — the whole video games industry — has sprung from us."

Arcade video games began before even the microchip was invented. Early games like *Pong* and *Breakout* were built using conventional transistor — transistor logic.

With the advent of the microprocessor the industry took off. *Space Invaders* was followed by a host of imitators. More advanced processors brought with them colour, sound and sprite handling. Two years ago saw the first multi processor game board using Z80s.

A typical circuit board now may have separate processors for each function of the game — master control console, sound, graphics.

Says Taitel's technical director, Jonathan Lister: "We see most of the new technology types at least six or eight months before the computing industry because all the major manufacturers work so closely with the chip designers. In turn the designs use our industry as a test-bed. We've had the 68000 and the 16-bit Z80 equivalent, the Z8000, for five or six months now and we are just getting involved with the 27128 128K Eproms."

As the arcade machines have increased in complexity, so they have lost flexibility. Each piece of hardware and software is very much dedicated to implementing a particular games idea. According to Jonathan, very few machines are now capable of being adapted to run more than one game.

One reason for the increased complexity of the circuit boards — apart from the quest for better games — is illegal copying of complete game boards. These days manufacturers spend a great deal of money and effort building in security.

To say that Taitel is an arcade game manufacturer is perhaps a little misleading. The industry makes the distinction between originators and manufacturers.

Companies like Sega, Taito, Gottlieb and Konami are originators — producing the game boards with the software in Eprom. Taitel then assembles the machines, builds the cabinets, power supplies, buys the monitors and the coin handling equipment. Taitel assembles about 120 machines a week. *Star Jacker*, a batch of machines just being finished, has its games software built into 15 128K Eproms.

This scale of Rom capacity is needed because for an arcade game to be competitive now it must feature both moving foregrounds and backgrounds. *Zaxxon* is a good example — "That game has an awful lot of screen information to handle — and at a much higher speed than a home computer game," says Jonathan.

Almost all video games origination takes place in either the US or Japan. "Either one side of us or the other," David grins, "whichever side — it's a long way away!"

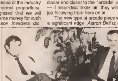
Assembled boards are brought in for between £300 and £500 and sold to the trade as completed machines for around £1,200.

By splitting off from Taito two years ago Taitel freed itself to build and distribute games of its choice from the whole range of originators.

"It put us in a very strong position to pick and choose the best games," says Jonathan. David agrees: "In today's market-place it is essential not to be tied to one particular originator."

Almost two years ago the coin-op video industry hit rock bottom. The *Space Invaders* boom — which had lasted for two years — tailed off and there was nothing to replace it. The recession hit and there was a lack of good games.

The industry is now climbing out of its trough and the expectations of the industry have reached more normal proportions. "It is generally recognised that we will never again take the same money for such long periods as *Space Invaders* did. Genuine operators and manufacturers now realise that the video gaming industry is here to stay and that it requires a steady investment in technology to develop a succession of successful games," explains Jonathan.


Jonathan Lister (left) and David Coren

"The whole period of *Space Invaders* was grossly over-exaggerated by the media and the sort of income figures quoted in newspapers at the time were the exception rather than the average.

The video game world has now settled down quite considerably — and has become a fashion industry. There are video game hits — and the top games change every couple of months."

David: "A top class game will last for a year or so. *Buck Rogers* from Sega is still taking good money after that length of time. *Frogger* is two years old."

Taitel spends "thousands of pounds every month on protecting the rights of the originators for which it has an exclusive licence. We will protect a game for whatever its life is," says David. "We would still protect *Space Invaders* for Taito five years on.

Pole Position is another long-lasting game from Atari. There still isn't a better driving game — a year after it was launched. There will be though in 1984."

This remark is a reference to a fundamental change taking place in the arcade video game world — computer video disc combination machines.

Sega has spent a reported $1.5m on developing the first laser disc arcade game mixing computer graphics and video pictures from disc. Called *Astron Belt*, the machines are much sought after and command a high price — about four times the cost of a conventional video games machine — around £4,700.

Other manufacturers have not been slow in following Sega's lead. Taito and Cinematronics both have machines on the way. Taito's — which Taitel plan to handle in the UK and which will be shown in September — is remarkable.

It is the race game which David Coren referred to. Called *Laser Grand Prix*, the game mixes an extremely realistic computer-generated field of racing cars with reel video footage from a car's point-of view of the Japanese Fuji racing circuit.

"The game takes realism to a new level — what it will do to the arcade industry, I don't know," says David.

"The new generation of games have one big advantage. Where in the past home computer games tended to follow on the heels of the arcade industry — getting closer and closer to the 'arcade' standard — if laser-disc takes off they will have a job following from here on in.

The new type of arcade piece will have a significant edge. *Astron Belt* is a space game and everybody has their own particular impressions about what future space travel may be. *Laser Grand Prix* is much more down to earth. Everybody has some perception of what it would be like to drive round a race track.

I would doubt that the depth of game given by *Laser Grand Prix* will be matched on a home computer for some considerable time."

And where next? David and Jonathan both foresee the possibility of an interactive game like *Laser Grand Prix* being played by players on separate machines linked together. Competing against the player on the next machine, rather than the computer. ■

The sound of beating arms

***Software author Simon Lane** turns reviewer and finds that the latest Spectrum games vary considerably in quality*

Sinclair Spectrums still seem to be selling like hot cakes despite the ever increasing number of micros competing for a share of the home computer market. The price reductions and the recent arrival of the long awaited *Microdrives* make the Spectrum as good a buy as it was on its launch 16 months ago. But, perhaps the main reason why people still opt for the machine is the amount of software available for it.

The older software companies are still pouring out software at an alarming rate, while new companies are being formed all the time. But the competition is stiff and however much is spent on promotion and public relations, the companies which will survive will ultimately be determined by the quality of the programs each one sells.

Spectrum Missile Defence comes from Anirog Software and is a version of that old arcade favourite, *Missile Command*. For those few, if any, who are not familiar with the game, the scenario is as follows: Your City is being attacked by ICBMs (Inter Continental Ballistic Missiles) from an unnamed Communist Superpower. Fortunately, you have a rather powerful laser cannon to hand, with which you can (with enough skill and dexterity) intercept the missiles and destroy them before they reach their targets (at the bottom of the screen).



As in most 'zap' games, the agressors come in waves, and with each new level the game becomes more difficult to play. *Spectrum Missile Command* is a very faithful copy of the original, having three independently controllable missile bases, attacking planes (corresponding to the good old saucers in *Space Invaders*) and a bonus at the end of each level — in fact, just about everything that was in the original version. Considering Atari's view on copyright, this may not have been such a good idea.

The only noticeable difference between the two is that in this version the six cities have been replaced by trucks, planes and various other pieces of equipment. Personally, I think that this is an improvement as it adds some variety to the game.

The only fault that I can find with the game is that it is very difficult to get used to the keys. 1, 2 and 3 are used to fire missiles from the corresponding missile bases while 5, 6, 7 and 8 (cursor keys) are used to position the sight. This arrangement tends to lead to difficulties, since you are forced to control the movement of the sight with one hand and, consequently, you tend to spend most of the time going up when you want to go down, and vice versa.

A robotic gardener

Diagonal movement is reserved for the superbly co-ordinated, since it requires the simultaneous depression of the relevant horizontal and vertical controls. However, the program is compatible with the Kempston joystick which makes life considerably easier. I assume that the use of the joystick sacrifices the ability to fire the missile bases independently of each other (the review copy did not have the joystick option).

Besides the relatively minor inconvenience of the keys, the game is excellent and is far better than the versions of the game available for other home computers (including the Atari).

Tranz Am from Ultimate Play the Game has a far more original game design. The inside of the cassette insert starts off like this:

"The year is 3472 and all that remains on Earth are the remanants of a once great continent, a barren land, a desolate place of sand, rocks and boulders. But ... Life adapts quickly and brings with it a New Age, a time ruled by cars and trophies, a land where petrol replaces gold and esteem is possession of the 8 Great Cups of Ultimate."

As with all the Ultimate games, the tape starts with an impressive piece of graphic artwork, but this time depicting a turbo charged racer instead of a space man or a robotic gardener. The controls are very simple to use, as there are only clockwise, anticlockwise, brake, accelerate and pause. The program can also be used with a Kempston joystick interface.

During the game the screen displays a very comprehensive collection of data. At the top left hand side of the screen are two figures, which represent the amount of time you have taken so far and the total number of miles travelled. Below this is a map of the United States, which shows refuelling points and your current position. Then there is another map which covers a smaller area and which shows the positions of any enemy Black Turbos and cups in the area. Next to this is a figure for the number of cups you have collected so far.

At the bottom left hand corner of the screen are your speedometer, fuel gauge, temperature gauge and a display of the number of lives you have left. The whole of the right hand side of the screen is taken up with a display of the area immediately surrounding your racer. This shows obstacles such as signs, boulders and cacti, as well as cups and fuel, and the deadly Black Turbos, of course.

The object of the game is quite simple — you must collect all eight cups, without being killed. However, this is made more difficult by the fact that you have to collect fuel at regular intervals in order to keep going. Also a number of other cars are out to get you by crashing into you, and some of them can go faster than you.

If you go too fast for too long, your engine over-heats and you have to slow down for a while to cool off.

The graphics, sound and presentation of the game are all of a very high quality. My only criticisms are that it is very difficult to concentrate on all the different pieces of information at once, and there is not enough of a reward for collecting all of the cups — on the one occasion that I did manage to pick up the eight cups, all I got for my efforts was a brief congratulatory message on the screen and the chance to go around again. All in all though, a very well written and addictive game.

Zip Zap from Imagine, is another game set in the future. In this game you are the only surviving member of Robot Prelim Team 0484, a group of worker and guard Droids sent on a reconnaissance visit to a previously unexplored planet.

However, just as the finishing touches are being applied to the teleportal system, the aliens inhabiting the planet attack in force. All the other Droids have been killed (if that's the right word) and your circuits are damaged. You are unable to turn off your motors. Your one objective is to survive for long enough to warn the approaching colonists, who are about to try and land on the aliens' planet.

The game is very difficult to play indeed. It is a bit like playing a game of *Asteroids* in which you cannot stop your spaceship

from moving When things start to get too difficult, you have to escape from the level you are on by collecting four fuel cells and teleporting to the next level

The main criticism that I have of the game is that, although it is addictive, it is so difficult and consequently frustrating to play that I find that I am unable to play it for more than a few minutes at a time However, this may be something that is unique to me Certainly it is a very impressive game in most respects

Kamikaze from A & F Software is based roughly on the arcade game *Galaxians* It is the old formula you are at the bottom of the screen with a laser cannon and you can move left and right The robotic war machines are hovering above you moving slowly left to right then right to left all the time lobbing plasma bolts at you Some of the galactic interlopers swoop down towards you and try to kill you

When you have killed all of the wardroids another lot (slightly different shapes this time) appears and you have to start all over again Every few screens you get the chance to score some bonus points in a shoot-out with some strange looking aliens that seem to resemble helicopters This is quite an interesting feature but is the only original addition to an otherwise cliched plot

Strike Attack from Micro Mart is intriguing to say the least It is an attempt to simulate the attack profile of a 'strike attack aircraft en route to its target

It does this perfectly well except for a few minor faults, the screen display is not very clean as, for some reason the program fails to clear the screen of old messages before printing new ones the abreviations used in the status table are not very clear in their meaning the screen scrolls every now and again which corrupts both the status table and the graphics the few graphics that there are are painfully slow (the program is 100 per cent Basic) At £6 50 the program is grossly over-priced What more can I say?

The Castle from Bug-Byte is a fairly standard text only adventure or at least it appears to be until you play it for any length of time Without giving too much away let me quote an example I was standing next to a chasm and had almost given up trying to get over it As a last resort, I tried typing in the *Help* command and in return the program gave me a rather meaningless phrase which I worked out to be an anagram of *Fly Chasm* So I typed *Fly Chasm* into the computer, to which it replied *How?*

After many attempts at guessing the answer to this question I finally gave up and, as I am prone to do in such circumstances typed in something which at the time I thought was stupid le *Flap Arms* To my amazement, however this was the phrase that the program was looking for and, before I could say *Magic Mushrooms* I was informed that I was on the Other Side'

The rest of the game continued in a similar vein I won t give any more examples for fear of spoiling your fun All I shall say is that I found it very hard going indeed If you enjoy playing adventure games and you like a challenge then I recommend that you buy this program

The other Bug-Byte program I looked at *General Election* did not impress me quite as much The program is a simulation of a general election Each player picks the party of his choice (Labour Conservative Liberal or SDP) and then has to gain as many seats as possible not to mention public support (in the form of national and regional swings), before the general election is called

Rolling the dice

Although I found quite a large amount of the program fairly interesting there were a lot of things that I didn t like about it I got the impression while playing the game that it had been converted from a board game For a start two to four players were required to play the game — there was no option in which human could play the computer Secondly most of the game seemed to be based around rolling a dice

In fact the only part of the game that actually required any of the players to think at all was when they had to choose a policy, and even that became fairly automatic after a while I think that Bug-Byte are going to have a hard time selling this program However if they had released it a few months ago

Aquaplane from Quicksilva is an original idea as far as I know Basically you have to manoeuvre a speedboat and accompanying water skier around various objects that appear in its path On the first level, you merely have stationary rocks and floating logs to cope with Then on the next level things start to get harder as yachts zig-zag all around you.

Next you have rocks logs and very fast-moving boats to contend with And if you can get past them on the next level you are confronted with sharks which actually snap at you

The controls are very simple — you can move the boat up and down and you also have a throttle control However to make things a bit more difficult the water skier starts to swing around if you move up or down with the throttle on

Graphically the program is very impressive indeed All of the graphics pixel scroll even though there is always a lot happening on the screen at any one time

The last program I will consider is *Xadom* also from Quicksilva The game is basically a cross between an 'arcade type game and an adventure game a real time adventure in fact The scenario is typical adventure, recapture a piece of stolen treasure and use it to operate a teleport device

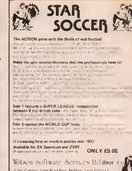
The game has most of the good features of an adventure game, problem solving, map making etc without some of the more irritating problems For example you never have to worry about how to phrase a command, since the only controls are up, down left right and fire

One of the more useful features of the game is the fact that you can be reincarnated several times in each game without losing any of your possessions However a number of points are deducted each time you die just to ensure that you give your life the respect that it deserves This game is good all round although there aren t any particular features that make it brilliant

The most notable thing about the software in this review is the variety both in quality and the types of program In general I think I can say that the standard of the software being released is improving although there is still a lot of pretty abominable software floating around ■

Firm	Program	Cost	Value (1-10)
Anirog Software 8 High Street Horley Surrey	*Spectrum Missile Defence*	£4 95	9
Ultimate Play the Game The Green Ashby de la Zouch Leicestershire LE6 5JU	*Tranz Am*	£5 50	9
Imagine Software Masons Buildings Exchange Street East Liverpool Merseyside L2 3PN	*Zip-Zap*	£5 50	8
A & F Software 830 Hyde Road Manchester M18 7JD	*Kamikaze*	£5 75	6
Micro Mart Software Greenhill Industrial Estate Kidderminster Worcs	*Strike Attack*	£6 50	2
(Bug-Byte Software) Software Express Freepost Liverpool L33 3AB	*The Castle* *General Election*	£6 95 £6 95	8 5
Quicksilva Ltd 13 Palmerston Road Southampton SO1 1LL	*Aquaplane* *Xadom*	£6 95 £6 95	9 7


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A character change

Peter Bartley explains how to define your own graphics in the third of a six-part series for the Vic20

Have you ever wondered what goes on inside your Vic? Obviously the computer isn't using the same keywords that we use when we type at the keyboard. It is in fact working in a 'lower' language which makes the speed of execution of programs much quicker.

So whenever the Vic communicates with us (error messages etc) or whenever we communicate with it, there is a fair amount of translation going on inside! To do this the Vic has to have a set of our characters. The ability to change these characters is the basis of high resolution graphics on the Vic (user-defining the graphics). Here is a simplified view of what we must do to obtain them (they are much, much better than Vic standard graphics).

When you turn on the Vic it does the housework (sets registers, flags etc which is why you only have 3.5K to play with rather than 5K). This "power-up" routine is "burnt into" Rom and includes data for forming the character alphabet. We cannot access Rom (that's why it's called Read Only Memory).

So it would seem at first glance that we cannot change the characters directly. Instead we read the character set from Rom into Ram. Each character is stored as a set of eight bytes, so to transfer 64 characters (the usual number) we need to read 64 x 8 = 512 bytes from Rom. We also need somewhere to put the data!

There are various suitable areas in Ram for this data but by far the best is from location 7168 on. To transfer the information we type

```
10 FOR A=7168 TO 7679:POKE A,PEEK(A+25600)
   NEXT
```

The *Peek* value here gives values from 32768 on, which is the area in Rom containing the upper case/full graphics data. Now we need to tell Basic to read its character information from our set in Ram rather than the Rom set. Fortunately for us this is very easy to do on the Vic. Register 36869 controls the 'pointer' which 'indicates' where to read character information. Change this and you change the location where the Vic gets its characters from. A value of 255 here does the trick, so enter

```
20 POKE 36869,255
```

Running the program has two effects: one, the cursor disappears (don't worry about it) and two, all the graphics characters on the screen turn into 'splodges'. This is because we haven't read their data into our Ram location.

There is one more thing we must do before the fun starts, and that is *Protect* our character set. You see, any Basic programs you write begin at location 4096 so when it's running the memory is filled out from this location. If we're not careful, our graphics may be overwritten by Basic blurb. Type

```
1 PRINT FRE(0)
5 POKE 52,28:POKE 56,28:CLR
9 PRINT FRE(0):END
```

Run the program. See? We have lost 512 bytes of memory. These bytes are the ones which contain our character data. Delete lines 1 and 9. Right, we're in business!!

Add the lines in Figure 1 to your program and run it. See? — a row of 'spacies'! Notice that they started off as *A*s. What we have done, in fact, is overwritten the data concerning *A* in our Ram character set with that in line 50.

Imagine an 8 * 8 grid of empty cells. Then imagine some of the cells filled in to make a pattern. Now consider the eight horizontal rows. If each shaded cell is represented by a 1, and each empty square by a 0, we have eight binary numbers which fully describe our grid (see Figure 2).

So what we do is design our character on an 8 * 8 grid, convert it into eight binary numbers and convert them into eight decimals (these are the 'eight bytes' per character I mentioned earlier!). Then you *Poke* the data into your Ram character set to produce hi-res graphics (in line 10 we transferred 512 bytes of character data into locations 7168 to 7679. The eight bytes concerning @ are from 7168 to 7175, concerning *A* from 7176 to 7183 etc). Simply choose which character you wish to overwrite and begin *Poking* your new data here using a loop as in line 40 (the *C* is a delay loop only. Delete it, but don't forget to make *Next C, A* simply *Next C*).

This is the best part, so enjoy yourself designing new spaceships, symbols etc. As I said, you have 64 to choose from! To reduce the tedium of all the sums, here's a binary/decimal converter (see Figure 3). Note the binary is entered as a string, and the 'mug-trapping' in lines 20 and 30.

Having changed the characters, it is easy to see how they would liven up any program! Next week we will take a look at sound effects. ■

Figure 1

```
1 POKE 36879,8:PRINT"{CLR}{RON}{GRN}"
30 FOR A=1 TO 10:PRINT"A{SPACE}";:NEXT:PRINT"{4CD}"
40 FOR A=7176 TO 7183:READ B:POKE A,B:FOR C=1 TO 100:
   NEXTC,A
50 DATA 60,126,219,255,189,153,66,129
```

Figure 2

```
..****.. = 00111100 = 60
.*.**.*. = 01011010 = 126
**.**.** = 11011011 = 219
******** = 11111111 = 255
*.****.* = 10111101 = 189
*..**..* = 10011001 = 153
.*....*. = 01000010 = 66
*......* = 10000001 = 129
```

Figure 3

```
10 INPUT"BINARY=";A$
20 IF LEN(A$)<>8 THEN 10
30 FOR A=1 TO 8:IF MID$(A$,A,1)<"0" OR MID$(A$,A,1)>"1"
   THEN 10
40 NEXT A
50 FOR A=1 TO 8:IF MID$(A$,A,1)="1" THEN B=B+2↑(8-A)
60 NEXT A
70 PRINT"DECIMAL=";B:CLR:GOTO 10
```


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A tour of the board

***Denis McCarthy** presents a simple program to explore the intricacies of the Knight's Tour*

This program for the 16K Spectrum demonstrates a sequence of moves known as the *Knight's Tour* to chess players. A chessboard and a knight are used in this sequence. The *Knight's Tour* involves the knight moving on to every square of the chessboard without going on to a square it has previously visited. All the moves have to be made just as the knight moves in a normal chess game.

For those of you not familiar with the movement of the knight — it moves in an L shape. If you imagine a 2 x 3 rectangle drawn on the board so that the knight occupies one corner of it then the knight can move to the opposite corner of that rectangle. There are many such rectangles which can be drawn and hence many possible moves are available. This makes the *Knight's Tour* a difficult trick to do.

The user enters the square which he wants the knight to start its tour from — instructions on how to do this are given in the program. The whole display is used to show various facts and details about the tour eg move number, current position, diagram of squares visited so far and the last move in algebraic notation.

The program centres around H$, which holds a chain of moves. This chain is broken into, depending where the knight starts, and a new chain is formed. This is worked through until the end is reached by which time the tour has finished.

On Running the program you are shown a chessboard display and are requested to enter the square you wish the knight to start its tour from. H$ is sliced at the place for that particular starting square (Lines 240 and 250).

The next screen display shows two boards. A large board shows the knight's current position while the smaller board is filled in with knights, to show where the knight has been.

When the *Knight's Tour* has been completed you are given the chance to see it again, with a new starting square if you wish. ■

```
  10 FOR a=144 TO 148  FOR b=0 T
O 7  READ c  POKE USR CHR$ a+b,c
  NEXT b  NEXT a
  20 DATA 12,28,63,59,56,24,60,1
26
  30 DATA 0,1,3,7,7,15,15,15
  40 DATA 128,128,224,240,248,25
2,252,204
  50 DATA 15,7,7,3,7,15,31,0
  60 DATA 192,128,128,0,192,224,
240,0
  70 LET H$="011117821227425751З
62106163146615540301307243956624
56050334337476454486525382005142
944694934190410263555256412609032
00515322220 10"
  80 BORDER 1  PAPER 0  INK 6  C
LS
  90 PRINT AT 1,5,"♞ THE KNIGHT'
S TOUR ♞"
 100 FOR B=7 TO 15 STEP 2
 110 PRINT AT B,12, PAPER 1," ■
■ ■ ■",AT B+1,12,"■ ■ ■ ■ "
 120 NEXT B
 130 FOR M=7 TO 14  PRINT AT M,1
1,15-M,AT M,20,15-M
 140 PRINT AT 6,5+M,CHR$ (M+58),
AT 15,5+M,CHR$ (M+58)
 150 NEXT M
 160 PRINT AT 17,0, INK 7," ENTE
R YOUR STARTING SQUARE FOR  THE
KNIGHT- LETTER THEN NUMBER"
 170 POKE 23658,8
 180 INPUT E$
 190 IF LEN E$<>2 THEN GO TO 180
 200 LET L=(CODE E$(1)-65)
 210 IF INT L<>L OR L<0 OR L>7 O
R CODE E$(2)<49 OR CODE E$(2)>56
 THEN GO TO 180
 220 LET N=9-VAL E$(2)
 230 PRINT AT 6+N,12+L, PAPER 7,
 INK 2, FLASH 1,"♞"
 240 FOR A=1 TO 127 STEP 2
 250 IF VAL H$(A TO A+1)<>N*8-7+
L THEN NEXT A
 260 LET H$=H$(A TO )+H$( TO A-1
)
 270 CLS
 280 FOR H=3 TO 9 STEP 2  PRINT
AT H,22, INK 4, PAPER 7,"■ ■ ■ ■
",AT H+1,22," ■ ■ ■ ■"  NEXT H
 290 PRINT AT 1,5, INK 7,"♞ THE
KNIGHT'S TOUR ♞"
 300 FOR S=2 TO 128 STEP 2
 310 LET C=VAL H$(S-1 TO S)
 320 LET PO=INT ((C-1)/8)
 330 LET A$="■■  ■■  ■■  ■■  ■■"
 340 FOR A=1 TO 2
 350 LET B=3-2*(A-2*INT (A/2))
 360 FOR Q=1 TO 2
 370 PRINT AT A*2+Q,3  PAPER 4,
INK 1,A$(B TO 15+B)
 380 NEXT Q
 390 NEXT A
 400 PRINT AT 3+PO,21+C-8*PO, PA
PER 2,"♞"
 410 PRINT PAPER 7, INK 0,AT PO*
2+3,(.5+C-8*PO)*2,"♞",AT PO*2+4
,(.5+C-8*PO)*2,"♞"
 420 PRINT AT 13,22, INK 7,"MOVE
",S/2
 430 LET LO=VAL ((H$(127 TO )+H$
( TO 126))(S-1 TO S))-1
 440 LET K=65+LO-8*INT (LO/8)
 450 LET O=56-INT (LO/8)
 460 IF S>2 THEN PRINT AT 17,22,
CHR$ K,CHR$ O," TO ",CHR$ (64+C-
8*PO),CHR$ (56-PO)
 470 BEEP .05,10  BEEP .1,-1
 480 NEXT S
 490 FLASH 1  PRINT AT 1 2,"♞ EN
D OF THE KNIGHT'S TOUR ♞"
 500 PRINT AT 20,3, PAPER 1, INK
 7," PRESS ANY KEY TO RE-PLAY "
 FLASH 0
 510 FOR V=-20 TO 20
 520 BEEP .01,V  BEEP .01,V-10
 530 IF INKEY$<>"" THEN GO TO 70
 540 NEXT V
 550 GO TO 510
```

Put on the map...

***John Meech** presents a simple geography quiz for the BBC model B*

This program is designed to be the basis for a very flexible geography quiz/game It contains a workable quiz of 10 cities in the UK, but additional cities towns rivers or any other kind of location can be added as desired

The essence of the quiz is this the name of a place is displayed and the player must move the small flashing cross to the location on the map where he or she thinks that place is located, before pressing 'C to see if they are correct This process continues until all the set places have been tested

The program is structured for ease of modification. To change the types of location tested for, simply replace the data at the end of the program with data of your own To find the location of the place use an atlas to find its correct position and then match it on to the grid overlay (fig 1) The co-ordinates start from 400 0 to allow for the scrolling text window and the small squares are 40 by 40 units Enter the *X* and *Y* co-ordinates after the place name at the end of the program then change the value of *Number* to the new number of data items (line 20)

I have included a modification to allow the use of joysticks rather than the keyboard but for those who want to try modifying the program themselves you could try to enable the program to read data in file form from tape or disk or modify the character printed at the correct location (at the moment this is a star but it could be the outline of a power station etc, by using user-defined characters)

Program description

Line	
10	Dimensions the arrays for holding place name and co-ordinates
20	Sets the number of data items used
30	Sets mode and initial values of W and JJ (A counter and the score)
40	Draws a border around the map
50 100	Read the co-ordinates and draw the map
140	Sets the cursor keys to produce a value
150	Sets the cursor keys to produce a value for INKEY$
190-210	Form main program loop
220	Calculates and prints the score
230	Plays a short tune if the score is high enough
270-340	Contain the data used to draw the map
300-430	Draw a cross at X Y The cross is drawn twice to erase itself and prevent erasure of the map by using GCOL3 3(X-OR white
440-560	Check the keyboard and change the co-ordinates of the cross accordingly
570-710	Print the instructions and read the place names and co-ordinates into arrays
720-790	Check to see if the guessed location is correct It plots a point where the guess was made and draws a star at the correct location It then increments the score
800-860	Print the name of the city to be found with a reference number in the text window
880 230	Plays a tune if the score was high enough
940 1040	Contain the data for the cities

SQUARES ARE 40*40

400,0

Fig 1

MAP
BY J.MEECH

1 LONDON
2 PLYMOUTH
3 BIRMINGHAM
4 MANCHESTER
5 NEWCASTLE
6 BELFAST
7 DUBLIN
8 GLASGOW
9 ABERDEEN
10 INVERNESS

SCORE:33



```
440 DEFPROCMOVE
450 REM ** JOYSTICK
    MODIFICATION ***
460 X=ADVAL(1)/50
470 Y=ADVAL(2)/64
480 DD=ADVAL(0) AND 3
490 FORI=1 TO 100:NEXTI
500 IF DD=1 THEN PROCCHECK
510 IFX>1240 X=1240
520 IFX<460 X=460
530 IFY>990 Y=990
540 IFY<30 Y=30
550 PROCCROSS
560 ENDPROC
```

```
>
>L.
    1REM ******* MAP ********
    2REM * (C) J.MEECH 1982 *
    3REM *********************
   10 DIM P$(50),X1(50),Y1(50)
   20 NUMBER=10
   30 MODE1:W=0:JJ=0
   40 MOVE450,20:DRAW450,1000:DRAW1250,
      1000:DRAW1250,20:DRAW 450,20
   50 FOR I=1 TO 100
   60 READ X,Y
   70 IF X=-1 AND Y=-1 THEN READ
      X,Y:MOVEX,Y
   80 DRAW X,Y
   90 SOUND 2,-10,50,.1
  100 NEXTI
  110 PRINTTAB(4,1)"MAP"
  120 PRINTTAB(1,2)"BY J.MEECH"
  130 PROCSETUP
  140 VDU19,2,12,0,0,0
  150 *FX 4,1
  160 X=1000:Y=400
  170 PROCCROSS
  180 PROCINDICATE
  190 REPEAT
  200 PROCMOVE
  210 UNTIL W>NUMBER
  220 PRINT''"SCORE: ";INT(1000/(JJ/10))
  230 IF (JJ/10)<30 THEN PROCMUSIC
  240 END
  250 REM ***** IRELAND *****
  260 DATA -1,-1
  270 DATA500,240,570,320,520,360,545,
      420,525,420,620,470,640,480,580,
      500,680,56
0,700,520,750,540,780,470,770,440,740,
      420,760,320,730,240,660,220,640,
      180,520,16
0,500,240
  280 REM ******* BRITAIN ******
  290 DATA -1,-1
  300 DATA780,60,820,40,850,80,900,70,
      950,120,1020,120,1050,160,1120,
      150,1180,18
0,1200,200,1150,210,1150,230,1200,270,
      1200,310,1180,350,1140,350,1130,
      350,1110,3
40,1110,380,1080,400,1060,400,1000,
      500,1000,560
  310 DATA950,620,920,610,940,640,
      920,660,980,780,880,760,910,
      860,860,840,820,85
0,800,800,780,780,790,700,750,660,
      760,640
  320 DATA 800,660,760,560,790,550,
      820,620,840,600,820,580,840,550,810,
      510,850,4
80,910,510,890,460,920,440,900,370,
      820,380,840,350,810,310
  330 DATA840,330,870,280,800,220,820,
      200,870,220,890,200,920,220,960,

0,850,160,820,80,780,60
  340 REM ******ISLANDS & LAKE******
- 350 DATA -1,-1,840,400,870,420,
      850,440,840,420,840,400,-1,-1,
      720,470,750,480,7
      40,500,710,500,720,470,-1,-1,1040,
      120,1060,120,1080,140,1060,140,
      1040,120
  360 DEFPROCCROSS
  370 LOCAL T
  380 FOR T=1TO2
  390 GCOL3,3
  400 MOVE X-10,Y:DRAW X+10,Y
  410 MOVE X,Y-10:DRAW X,Y+10
  420 NEXTT
  430 ENDPROC
  440 DEFPROCMOVE
  450 S=INKEY(0)
  460 IF S=136 X=X-10
  470 IF S=137 X=X+10
  480 IF S=138 Y=Y-10
  490 IF S=139 Y=Y+10
  500 IF S=67 PROCCHECK
  510 IFX>1240 X=1240
  520 IFX<460 X=460
  530 IFY>990 Y=990
  540 IFY<30 Y=30
  550 PROCCROSS
  560 ENDPROC
  570 DEFPROCSETUP
  580 VDU28,0,30,12,4
  590 PRINTTAB(0,4);"THIS IS A"''
      GEOGRAPHICAL"'"EXERCISE."''"
      ON PRESSING
  600 PRINT"RETURN A "'"LIST OF"'"
      CITIES"'"WILL BE"'"PRINTED"'
      "YOU MUST"
  610 PRINT MOVE THE"'"CROSS TO"'
      "WHERE YOU"'"THINK THAT"'
      "CITY IS"'"USING THE
  620 PRINT"CURSOR KEYS "'"<ARROWED>"
  630 PRINT"AND WHEN"'"THERE PRESS"'
      "<C> TO CHECK"''"PRESS <SPACE>"'
      "TO START"
  640 AA$=GET$
  650 RESTORE940
  660 VDU12
  670 FORI=1TONUMBER
  680 READP$(I),X1(I),Y1(I)
  690 SOUND2,-5,10,1
  700 NEXTI
  710 ENDPROC
  720 DEFPROCCHECK
  730 SOUND1,-10,100,2
  740 VDU5:GCOL0,1:MOVEX,Y:PLOT69,X,Y
  750 GCOL0,2:MOVE X1(W),Y1(W):
      PRINT"*";W
  760 JJ=JJ+ABS(X1(W)-X)+ABS(Y1(W)-Y)
  770 GCOL 3,3
  780 PROCINDICATE
  790 ENDPROC
  800 DEFPROCINDICATE
  810 W=W+1
  820 VDU4
  830 IF W>NUMBER ENDPROC
  840 COLOUR1
  850 PRINTTAB(0,(W));W;" ";P$(W)
  860 ENDPROC
  870 DEFPROCMUSIC
  880 RESTORE 910
  890 FOR I=1 TO 15:READ V1,A1:SOUND
      1,V1,A1,3
  900 NEXTI
  910 DATA -15,49,-15,41,-15,33,0,0,
      -15,33,0,0,-15,41,-15,49,-15,53
  920 DATA -15,61,0,0,-15,61,0,0,-15,
      61,-15,49
  930 ENDPROC
  940 REM******* PLACES ********
  950 DATA LONDON,1110,210
  960 DATA PLYMOUTH,870,95
  970 DATA BIRMINGHAM,990,280
  980 DATA MANCHESTER,950,400
  990 DATA NEWCASTLE,980,510
 1000 DATA BELFAST,750,470
 1010 DATA DUBLIN,730,330
 1020 DATA GLASGOW,830,580
 1030 DATA ABERDEEN,930,740
 1040 DATA INVERNESS,850,760
```


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Search and destroy

Shaun Freeman presents Starbase, a new game for the Dragon

The purpose of this game is to destroy three alien ships which are moving at random around the screen. A cross which represents your sight can be moved about the screen by the cursor keys. Pressing the spacebar fires your photon lasers.

Your fuel supply is shown at the bottom of the screen — when your fuel runs out the game ends.

There are five levels of play. But after you complete each level, you will need progressively more fuel in order to qualify for the next level since your ship will be more battle-worn. The amount of fuel needed increases by 20 units each level.

If you complete level 5, you will be awarded a rating, depending on how much fuel you have used.

Variables

x,y	Position of cross
ax,ay bx by cx,cy	Position of alien ships
fu	Fuel supply
en	Fuel needed to qualify for next level
px	Position of planet

```
10 EN=200 LE=0:08=FU-5
20 CLS
30 DIMAL(19,12),PL(33,32),SP(14,14),BL
   (19,12)
40 AX=RND(100)+50:AY=RND(80)+50 BX=AX+
   10 BY=AY+10 CX=AX-10 CY=AY-10:PX=18
   :X=126:Y=84 S1=2 S2=2 S3=2
50 PMODE4,1 SCREEN0,1:PCLS
60 DRAW"BM9,4;S4;D1L2D1L2D1L1R3D1R5U1R
   3L1U1L2U1L2U1L1"
70 GET(0,0)-(19,12),AL,G
80 GET(100,100)-(119,112),BL,G
90 PCLS
100 CIRCLE(27,20),10
110 CIRCLE(27,20),16,,.4,.85,.67
120 GET(10,10)-(43,42),PL,G
130 PCLS DRAW"BM7,4,R1D2R1D1R2D1L2D1L1
    D2L1U2L1U1L2U1R2U1R1U2R1"
140 GET(0,0)-(14,14),SP,G
150 PMODE4,1 SCREEN1,1 PCLS
160 LINE(6,6)-(250,106),PSET,B
170 LINE(2,2)-(253,189),PSET,B
180 LINE(6,6)-(250,176),PSET,B
190 LINE(10,179)-(246,183),PSET,B
200 PAINT(3,3),5,5
210 FORI=0 TO 12
220 PSET(RND(246)+6,RND(164)+6,5):NEXT
230 PAINT(11,180),5,5
240 FU=245
250 LINE(FU,180)-(FU,182),PRESET
260 FU=FU-1
270 PUT(PX,20)-(PX+33,20+32),PL,PSET
280 PX=PX+0.5
290 IFFU<55 THEN SOUND200,1
300 IFFU<EN THEN PLAY"T170,FEDEFBCAEDG
    FBCEAFCBAEFGGEABCGDEBGDCAEGDACEBGF
    CAEFBGED
CFBGEA":GOTO620
310 PUT(X,Y)-(X+14,Y+14),SP,PSET
320 IFPEEK(344)=223 THEN X=X+3
330 IFPEEK(342)=223 TNEN Y=Y+3
340 IFPEEK(341)=223 THEN Y=Y-3
350 IFPEEK(343)=223 THEN X=X-3
360 IFPEEK(345)=223 THEN 630
370 IFS1=2 THEN 720
380 IFS2=2 THEN 730
390 IFS3=2 THEN 740
400 IFS1=0 AND S2=0 AND S3=0 THEN EN=
EN+20 LE=LE+1:IFLE=5 THEN 750 ELSE 40
410 F=RND(4):IFF=1 THEN AX=AX+4:BX=BX
    -4 CY=CY+4
420 IFF=2 THEN AX=AX-4 BX=BX+4 CX=CX-4
430 IFF=3 THEN AY=AY+4 BY=BY-4 CY=CY-4
440 IFF=4 THEN AY=AY-4:BY=BY+4:CX=CX+4
450 IFAX<8 THEN AX=8
460 IFBX<8 THEN BX=9
470 IFCX<9 THEN CX=8
480 IFX<8 THEN X=8
490 IFAX>234 THEN AX=234
500 IFBX>234 THEN BX=234
510 IFCX>234 THEN CX=234
520 IFX>234 THEN X=234
530 IFAY<8 THEN AY=8
540 IFBY<8 THEN BY=8
550 IFCY<8 THEN CY=8
560 IFY<0 THEN Y=0
570 IFAY>160 THEN AY=160
580 IFBY>160 THEN BY=160
590 IFCY>160 THEN CY=160
600 IFY>160 THEN Y=160
610 GOTO250
620 PRINT"YOU HAVE NOT GOT ENOUGH FUEL
    TO MAKE IT BACK TO THE MOTHERSHIP.
    ":PRINT@235,"GAME OVER!" END
630 LINE(6,176)-(X+5,Y+6),PSET LINE
    (250,176)-(X+8,Y+6),PSET
640 LINE(FU,180)-(FU,182),PRESET
650 F=FU-1
660 PLAY"T255,L255;V31;O3;BAGFEDC"
670 IFX>AX-9   AND X<AX+10 AND Y>AY-9
    AND Y<AY+10 THEN S1=0 PUT(AX,AY)-
    (AX+19,AY+12),BL,PSET
680 IFX>BX-9 AND X<BX+10 AND Y>BY-9
    AND Y<BY+10 TNEN S2=0:PUT(BX,BY)-
    (BX+19,BY+12),BL,PSET
690 IFX>CX-9 AND X<CX+10 AND Y>CY-9
    AND Y<CY+10 THEN S3=0 PUT(CX,CY)-
    (CX+19,CY+12),BL,PSET
700 LINE(6,176)-(X+5,Y+6),PRESET LINE
    (250,176)-(X+8,Y+6),PRESET
710 GOTO250
720 PUT(AX,AY)-(AX+19,AY+12),AL,PSET:
    GOTO380
730 PUT(BX,BY)-(BX+19,BY+12),AL,PSET:
    GOTO390
740 PUT(CX,CY)-(CX+19,CY+12),AL,PSET:
    GOTO410
750 CLS:IFFU<25 THEN PRINT"YOU WERE
    LUCKY AS YOU HAD LITTLE FUEL LEFT"
760 IFFU<50 AND FU>25 THEN PRINT"WELL
    DONE.YOU ARE IMPROVING."
770 IFFU>50 AND FU<100 THEN PRINT"YOU
    ARE PROMOTED TO CAPTAIN."
780 IFFU>100 AND FU <150 THEN PRINT
    "YOU ARE NOW A STAR TROOPER."
790 IFFU<210 AND FU>150 THEN PRINT"YOU
    ARE A STAR WARRIOR."
800 IFFU>210 THEN PRINT"HAVE YOU EVER
    THOUGHT ABOUT      BECOMING THE
    MASTER OF THE       UNIVERSE."
```

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The final countdown

Concluding our series on machine code master

Module 1 15
Now that we can give a name to the file in which the information contained in an area of memory is going to be stored and can specify the start point and end point we can proceed to enter this module which will store the information on tape or disc

Commentary
Line 14125 simply checks that the user has not defined a block of memory whose end point is before its start

A file is opened in line 14130, in this case an output file, with the destination of the information being dictated by the value of the variable *Dev* (device) In the listing of this program it is set at 1 (line 10035), which directs the output to a cassette recorder If you are using a disc drive then *Dev* should be set to 8 in line 10035

Once the output file is opened, the first two pieces of information to be stored in it are the start address (*AD*) and the end address (*EA*) Later in the program a facility will be added to allow you to change the current device number at will

The contents of each byte in the block of memory to be saved are now stored one by one in the file At the end of the loop the file is closed

Module 1 16
This module is simply the mirror image of the last one Instead of placing information *into* a file, this module takes previously stored information *from* the file and places it back into the computer memory.

Summary
Having entered the whole of the Monitor you are now free to play about with it, though its full power will only be realised once the rest of the Mastercode program is entered Try entering a new line

9 A=13

Call up the menu option which allows the memory to be changed and alter the contents of byte 805 hex to *8F* (143) List the program to −1 and you will see that your first line has changed to a Rem statement (143 represents Rem in the program file) Unless you are very sure of what you are doing it would be wise not to try to change too many other memory locations at present, and certainly not before you have properly saved your final version of the monitor If you do want to mess about, try modifying some of the colour attribute bytes from *D800-DBFF* hex, the colour attributes memory of the screen ■

This is an extract from *Commodore 64 Machine Code Master* by David Lawrence and Mark England published by Sunshine Books

MODULE 1.15

```
14100 REM*****************************
14101 REM MACHINE CODE SAVE
14102 REM*****************************
14110 GOSUB 11250 : GOSUB 12050 : GOSUB
11200
14115 T$ = "N" : IF DEV=8 THEN INPUT "OV
ERWRITE EXISTING FILE ( Y/N ) : "; T$
14116 IF T$="Y' THEN IN$ = "@0:"+IN$
14120 IF DEV=8 THEN IN$ = IN$+",S,W"
14125 IF SA>EA THEN 14190
14130 OPEN 2,DEV,2,IN$ : PRINT# 2,AD : P
RINT# 2,EA
14150 FOR X = AD TO EA : PRINT# 2,PEEK(X
) : NEXT : PRINT# 2 : CLOSE 2
14190 RETURN
```

MODULE 1 16

```
14300 REM*****************************
14301 REM MACHINE CODE LOAD
14302 REM*****************************
14310 GOSUB 11250 : IF DEV=8 THEN IN$ =
IN$+",S,R"
14320 OPEN 2,DEV,0,IN$ : INPUT# 2,SA,EA
: IF ST THEN CLOSE 2 : RETURN
14350 FOR X = SA TO EA : INPUT# 2,T : PO
KE X,T : NEXT : CLOSE 2 : RETURN
```

OPEN FORUM

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published.

Boot Hill

on Oric

In this game, written for the 48K Oric, you are the hardest sheriff in the West. Your job is to clear the dirt and grime off the streets.

You the cowboy on the left do this by firing using the space bar found on the bottom of your ergonomic keyboard. You can also move up and down with the cursor control keys to the left of the space-bar.

Your aim is to hit the meanest shot in town which is on the right of the screen and controlled by the computer but the cacti don't help.

A running score is kept above each cowboy and once someone has been hit there is a little surprise (NB I'm not very musically inclined).

Two machine code routines are used to help with the driveability of the Oric. The first located at address 40600 prints both cowboys to the screen and the second at 40460 is the firing mechanism. Once the program has been typed in and *Run* there is a short pause while the code is being stored. As an added difficulty, if two bullets collide, the outcome occurs almost at random. So good shooting!

```
10 HIMEM 40400
20 GOSUB 550
30 PAPER 7:INK 4:H=0:C=0:D=40
40 POKE #26A,10:CLS
50 PLOT 5,0,1:PLOT 6,0,STR$(H):PLOT 33,0,STR$(C)
60 PLOT 13,1,1:PLOT 14,1,14:PLOT 13,2,1:PLOT 14,
   2,14
70 PLOT 15,1,"BOOT-HILL":PLOT 15,2,"BOOT-HILL"
80 FOR A=1 TO 7
90 FOR B=0 TO 1
100 POKE A(A)+B*40,109+B
110 POKE A(A)+B*40+2,109+B
120 NEXT B
130 FOR B=0 TO 2
140 POKE A(A)+80+B,111+B
150 NEXT B
160 POKE A(A)+121,110:POKE A(A)+161,114
170 NEXT A
180 DOKE 1,48287:DOKE 3,48314:POKE 40460,255:POKE
   40465,255
190 CALL 40512:IF PEEK(40460)=254 OR PEEK(40465)
   =254 THEN 370
200 GOSUB 240
210 CALL 40512:IF PEEK(40460)=254 OR PEEK(40465)
   =254 THEN 370
220 GOSUB 320
230 GOTO 190
240 IF PEEK(520)=56 THEN 270
250 M=40*(PEEK(520)=172ANDDEEK(1)>48162)-40*
   (PEEK(520)=180ANDDEEK(1)<48922)
260 DOKE 1,DEEK(1)+M
270 IF DEEK(3)>48162 AND DEEK(3)<48922 AND RND(1)<
   .2 THEN 310
280 IF DEEK(3)<48162 OR DEEK(3)>48922 THEN
   D=-D:GOTO300
290 IF RND(1)>.75 THEN D=-D
300 DOKE 3,DEEK(3)+D
310 CALL 40600:RETURN
320 IF PEEK(520)<>132 OR PEEK(40460)<>255 THEN 340
330 SHOOT:DOKE 6,DEEK(1)+82:POKE 40460,0
340 IF PEEK(40465)<>255 THEN RETURN
350 IF DEEK(1)<>DEEK(3)-27 AND RND(1)>.2
   THEN RETURN
360 SHOOT:DOKE 8,DEEK(3)+51:POKE 40465,28:RETURN
370 F=DEEK(3)+40:T$="C2C2B9C2EKD9DKCKC9BKC":H=H+1
380 IF PEEK(40465)=254 THEN P=DEEK(1)+40:H=H-1
   :C=C+1
390 REPEAT
400 POKE P,116:POKE P+1,117:POKE P+40,118:POKE
   P+41,119
410 POKE P+80,32:POKE P+81,32
420 P=P-40
430 IF T$<>"" THEN GOSUB 480 ELSE WAIT 50
440 UNTIL P<48162
450 IF T$="" THEN 470
460 REPEAT:GOSUB 480:UNTIL T$=""
470 WAIT 100:GOTO 40
480 N=ASC(LEFT$(T$,1))-64
490 L=ASC(MID$(T$,2,1))-20
500 MUSIC 1,0,N,15:MUSIC 2,1,N,5
510 PLAY 3,0,0,0
520 WAIT L
530 T$=RIGHT$(T$,LEN(T$)-2):PLAY 0,0,0,0
540 RETURN
550 FOR A=0 TO 22
560 FOR B=46856+A*8 TO 46863+A*8
570 READ C:POKE B,C
580 NEXT B,A
590 ADD=40470
600 REPEAT:READ D$
610 D1$=LEFT$(D$,1):D2$=RIGHT$(D$,1)
620 V=(ASC(D1$)-48+((ASC(D1$)>64)*7))*16
630 V=V+(ASC(D2$)-48+((ASC(D2$)>64)*7))
640 POKE ADD,V
650 ADD=ADD+1
660 UNTIL D$="A*"
670 FOR A=1 TO 7:READ A(A):NEXT A
680 RETURN
690 DATA 15,15,63,14,12,15,3,31,0,0,56,32,48,
   32,0,48
700 DATA 63,63,54,54,55,55,48,63,48,48,48,16,60,
   63,20,48
710 DATA 31,7,7,7,7,23,63,23,32,0,0,0,0,0,48,48
720 DATA 0,0,7,1,3,1,0,3,60,60,63,28,12,60,48,62
730 DATA 3,3,3,2,15,63,10,3,63,63,27,27,59,59,3,63
740 DATA 1,0,0,0,0,0,3,3,62,56,56,55,56,58,63,58
750 DATA 0,0,0,8,28,62,28,62,28,62,28,62,28,62,28,
   62
760 DATA 28,62,30,31,15,7,0,0,0,0,42,53,63,63,28,
   62
770 DATA 28,62,60,60,56,48,0,0,28,62,28,62,28,62,
   28,8
780 DATA 0,0,0,0,0,24,0,0,1,3,7,14,30,24,24,30
790 DATA 32,48,56,28,30,6,6,30,14,14,6,6,3,3,1,0,
   28,28,24,24,48,48,32,0
800 DATA 18,69,97,10,06,A0,FE,8C,11,9E,60,A9,20,91
   ,D8,A0,FF,8C,11,9E,60
810 DATA 18,69,43,10,06,A0,FE,8C,DC,9E,60,A9,20,91
   ,06,A0,FF,8C,DC,9E,60
820 DATA AC,11,9E,C0,FF,F0,22,A9,20,91,08,88,B1,08
   ,C9,20,D0,C4,A9,73,91
830 DATA D8,C0,00,F0,06,8C,11,9E,4C,69,9E,A9,20,91
   ,08,A0,FF,8C,11,9E
840 DATA AC,DC,9E,C0,FF,D0,01,60,A9,20,91,06,C8,B1
   ,06,C9,20,D0,AF,A9,73
850 DATA 91,06,C0,1C,F0,04,8C,DC,9E,60,A9,20,91,06
   ,A0,FF,8C,DC,9E,60
860 DATA EA,EA,EA,EA,EA,EA
870 DATA A0,A0,A9,20,A2,02,91,01,91,03,C8,CA,D0,F8
   ,98,08,F0,05,A0,D0
880 DATA 4C,90,9E,20,C0,9E,A2,66,20,03,9E,20,C0,9E
   ,A2,60,20,D3,9E,60
890 DATA A6,01,A4,02,A5,03,85,01,8A,85,03,A5,04,85
   ,02,98,85,04,60
900 DATA A0,28,A9,F0,48,A9,FE,48,E8,84,91,01,C8,68
   ,18,69,01,D0,F4
910 DATA 98,18,69,26,D0,97,9E,AC,97,9E,40,18,69,01
   ,D0,E1,60,A*
920 DATA 49173,48263,48377,48540,48652,48706,48857
```

Boot Hill
by Keith Thomas

Atomic Grid

on Commodore 64

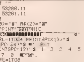
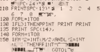
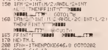
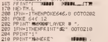
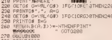
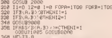
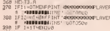
In this game you must strategically place spent rods of atomic fuel on an 8 × 8 grid of cells in such a way as to leave your opponent occupying none of the cells. In your go you may place one of your rods anywhere on the playing area, provided that the cell is either vacant or occupied by one of your own pieces.

The number of fuel rods that each square can hold is determined by its position on the board. In the corners this number is two, on the edge three and elsewhere on the board four. When the maximum is reached the contents of that cell explode onto any adjacently surrounding squares and the number of rods in any of these squares is incremented by one. Since this can cause the number of rods in the squares affected to reach the maximum value, multiple explosions are possible. Once exploded onto the square and its contents come under your possession. The cell that originally exploded and any that explode subsequently are emptied.

Enter your move in normal cartesian co-ordinate form i.e. (X,Y). The number of rods in any square is printed in the centre of that square. The winner is the first to leave his opponent without an occupied square.

Program notes

90-170	Set up screen display
200-250	Input move
1000-1050	Display cell contents
2000-2400	Explosions
5000-5020	Empty exploded square
9000-9030	Determine position of square and hence calculate its maximum value

```
5 PRINT ""
7 POKE 53280,11
8 POKE 53281,11
10 N=-1
20 A$(0)="■" A$(2)="■"
   90 PRINT"■ATOMIC
   GRID■■■■■■■■■■■■■■          ■"
100 FORL=1TO24 PRINTSPC(13)"■
   ■"SPC(24)"■ ■" NEXT
110 PRINTSPC(13)"■ 1  2  3  4  5
   6  7  8  ■",
120 FORL=1TO8
130 IFL>1THENPRINT PRINT PRINT
135 PRINT SPC(14),
140 FORM=1TO8
150 IFM/2=INT(M/2)ANDL/2=INT
   (L/2)THENPRINT"  ■■■■
   ■■■■  ■" GOTO170
160 IFM/2<>INT(M/2)ANDL/2<>INT(L/2)
   THENPRINT"  ■■■■
   ■■■■  " GOTO170
165 PRINT"  ■■■■  ■■■■  ■
170 NEXTM,L
200 IFN=-1THENPOKE646,8 GOTO202
201 POKE 646,12
202 PRINT"■■PLAYER # ",
203 IFN=1THENPRINT"■2" GOTO210
204 PRINT"1"
210 PRINT"■WHERE?       ■■■■■ ,
220 GETG$ G=VAL(G$) IFG<1ORG>8THEN220
230 PRINTG$",", A=G
240 GETG$ G=VAL(G$) IFG<1ORG>8THEN240
250 PRINTG$ B=G
260 IFSGN(B(A,B))=-NTHENPRINT"
   ■■■■■■       " GOTO200
270 GOSUB1000
280 GOSUB9000
290 IFABS(B(A,B))<CTHENN=-N GOTO200
300 GOSUB 2000
310 I1=0 I2=0 I=0 FORA=1TO8 FORB=1TO8
320 IFB(A,B)<0THENI1=1
330 IFB(A,B)>0THENI2=1
340 GOSUB9000
350 IFABS(B(A,B))>=CTHENI=1
   GOSUB1005 GOSUB2000
360 NEXTB,A
370 IFI1=0THENPRINT"■■■■■■■PLAYER
   # ■■■■■■■■WINS" GOTO500
380 IFI2=0THENPRINT"■■■■■■■PLAYER
   # ■■■■■■■■WINS" GOTO500
390 IF I=1THEN310
400 N=-N GOTO200
500 GETG$ IFG$<>""THEN500
505 PRINT"■■ANOTHER GAME?"
510 GET G$ IF G$<>"Y"AND
   G$<>"N"THEN 510
520 IF G$="Y"THEN RUN 10
530 PRINT "■■■■■■■■■■■■■■■■■■■■■■"
999 END
1000 B(A,B)=B(A,B)+N
1005 PRINT"■"SPC(14),
1010 IF A>1THEN FORL=2TOA
   PRINT"■■■", NEXT
1020 IFB>1THENFORM=7TOBSTEP-1
   PRINT"■■■", NEXT
1030 IFN=1THENPOKE646,12 GOTO1040
1035 POKE 646,8
1040 PRINTA$(N+1)"    ■■■■"
   STR$(ABS(B(A,B)))" ■■■■   T■■",
1050 RETURN
2000 REM*****EXPLOSION*******
2001 IFN=1THENPOKE646,12 GOTO2010
2002 POKE646,8
2010 PRINT"■ ■ ■■■■"RIGHT$(STR$(ABS
(B(A,B))),1)" ■■■■ / T■■■■ ,
2020 FORLL=1TO100 NEXT
2025 B(A,B)=B(A,B)-C*N IFB(A,B)
   <>0THENGOSUB5000 GOTO2060
2050 IFPEEK(646) PRINT"■  ■■■■
   ■■■■  T■■■■' POKE 646,0
2060 REM
2360 IFA=1THEN2370
2361 B(A-1,B)=ABS(B(A-1,B))*N+N
2362 PRINT"■■■"
2363 PRINTA$(N+1)"    ■■■■"STR$(ABS(B
   (A-1,B)))" ■■■■   T■■■■"
2367 PRINT"■■■"
2370 IFA=8THEN2380
2371 B(A+1,B)=ABS(B(A+1,B))*N+N
2372 PRINT"■■■"
2373 PRINTA$(N+1)"    ■■■■"STR$(ABS
   (B(A+1,B)))" ■■■■   T■■■■"
2374 PRINT"■■■"
2380 IFB=1THEN2390
2381 B(A,B-1)=ABS(B(A,B-1))*N+N
2382 PRINT"■■■"
2383 PRINTA$(N+1)"    ■■■■"STR$(ABS
   (B(A,B-1)))" ■■■■   T■■■■"
2384 PRINT"TTT",
2390 IFB=8THEN2400
2391 B(A,B+1)=ABS(B(A,B+1))*N+N
2392 PRINT"TTT",
2393 PRINTA$(N+1)"    ■■■■"STR$(ABS(B
   (A,B+1)))" ■■■■   T■■■■"
2394 PRINT"■■■"
2400 RETURN
5000 IFN=1THENPOKE646,12 PRINT"■",
   GOTO5010
5005 POKE646,8
5010 PRINT"    ■■■■"STR$(ABS(B(A,B)))"
   ■■■■   T■■■■
5020 RETURN
9000 C=4
9010 IFA=8ORA=1THENC=C-1
9020 IFB=8ORB=1THENC=C-1
9030 RETURN
```

Atomic Grid
by David Webster

Star Trek

on Vic20

You too can now play the motion picture adventure

Program notes

5-59	Set up screen
96-101	Draw sight
162 173	Movement
305-313	Draw alien

Controls

W	Up
X	Down
A	Left
D	Right
S	Phasers
F1	Shield up
F3	Shield down
F7	Torpedoes

```
1 TI$="000000"
2 PRINT"" POKE36879,15
4 Y=30720 H=30720
5 DEFFNR(X)=INT(RND(1)*X+1)
6 FORI=1TO50 A=FNR(220)+7702 POKEA,46
  POKEA+Y,FNR(6) NEXT
12 FORT=7680TO7701 POKET,127 POKET,127
  POKET+H,1 NEXT
14 FORT=7922TO7943 POKET,127 POKET+H,
  1 NEXT
16 FORT=7701TO7943STEP22 POKET,127 POKE
  T+H,127 POKET+H,1 NEXT
20 FORT=7702TO7922STEP22 POKET,127
  POKET,127 POKET+H,1 NEXT
2? FORT=7944TO8155 POKET,160 POKET+H,7
  NEXT
29 A$="READY" B=2 C$="DOWN"
30 SC=0
31 E=5000 F=INT(RND(1)*12) G=INT(RND(1
  )*15)
33 PRINT"PHASERS   ",A$
34 PRINT"TORPEDOS  ",B
35 PRINT"SHIELD  ",C$
38 PRINT"ENERGY   " E
39 PRINT"WARP ",F,"VECTOR ",G
40 PRINT"CONDITION  " H$
50 PRINT"SCORE " SC
95 M=7680 N=30720
96 POKEM+74,112 POKEN+74,112 POKEM+N+7
  4,1 POKEM+76,114 POKEN+76 114 POKEN
  +M+76 1
97 POKEM+73,110 POKEN+76,110 POKEM+N+7
  6,1 POKEM+118 107 POKEN+118,107
  POKEM+N+118,1
98 POKEM+120 91 POKEN+120 91 POKEM+N+1
  20,1 POKEM+122,115 POKEN+122,115
  POKEM+N+122,1
99 POKEM+162,109 POKEN+162,109 POKEM+N
  +162,1
100 POKEM+162,109 POKEN+162,109 POKEM+
  N+162 1 POKEM+164,115 POKEN+164,
  110 POKEM+N+164,1
101 POKEM+166,125 POKEN+166,125 POKEM+
  N+166 1
153 X=7650 Y=30720
155 S=INT(RND(1)*4)
156 IFS=1THEN =7630 GOTO0305
158 IFS=2THEN =7712 GOTO0303
159 IFS<1THEN155
160 IFS>3THEN155
162 GETA$ IFA$=""THEN162
163 IFA$="W"THENX=X+22 Y=Y+22 GOTO300
164 IFA$="X"THENX=X-22 Y=Y-22 GOTO300
165 IFA$="A"THENX=X+1 Y=Y+1 GOTO300
166 IFA$="D"THENX=X-1 Y=Y-1 GOTO300
167 IFA$="S"THENGOTO700
168 IFA$="■"THENE=E-1000 GOTO0525
169 IFA$="■"THEN550
172 IFA$="■"THEN172
173 IFB=-1THEN162
174 GOTO625
300 IFS=1THEN304
301 IFS=2THEN304
302 IFS=3THEN304
303 PRINT"ESCAPED"
304 IFTI$="000300"THEN7000 POKEX+131,32
305 POKEX+63 32 POKEX+84 32 POKEX+95 32
  POKEX+104,32 POKEX+108,32 POKEX+
  127,32
306 POKEX+152 32 POKEX+171,32 POKEY+172,
  32 POKEX+173,32
307 POKEX+105,65 POKEY+105,95 POKEX+Y+
  105 7 POKEX+107,73 POKEY+107,73
  POKEX+Y+107,7
308 POKEX+127 107 POKEY+127,107 POKEX+Y
  +127,7 POKEX+128,81 POKEY+128,81
  POKEX+Y+128 7
309 POKEX+129 115 POKEY+129,115 POKEX+Y
  +129 7 POKEX+149,74 POKEY+149,74
  POKEX+Y+149,7
310 POKEX+151 75 POKEY+151,75 POKEX+
  Y+151,7
311 POKEX+106,32 POKEX+150,32
312 POKEX+126,32 POKEX+130,32 POKEX+
  148,32
313 POKEX+108 32
314 IFX=7712THEN5000
315 GOTO162 END
316 END
525 POKE36879 10
526 PRINT"UP " V=1
527 PRINT" E E=E-1000
528 IFE=0THEN2000
529 GOTO162 END
550 POKE36879,15 PRINT"DOWN" V=5
551 GOTO162 END
625 PRINT"",B B=B-1 IFB=-1THEN162
626 POKE36878 10 FORL=250TO128STEP-1
  POKE36876,L FORM=1TO20 NEXTM NEXTL
  POKE36876 0
627 POKE36877 200 FORL=15TO0STEP-.05
  POKE36876,L NEXTL POKE36877,0
637 A=7800
638 IFPEEK(A)=81THEN645
640 IFPEEK(A)<81THEN162
641 IFPEEK(A)>81THEN162
645 SC=SC+100 PRINT"",SC
646 E=E+1000 PRINT"TTTT"
  ,E GOSUB1000
649 GOTO162
650 END
```

```
700 POKE36875,15 FORL=1TO2 FORM=250T
    O240STEP-1
701 POKE36876,M NEXTM FORM=240TO250
    POKE36876 M NEXTM
702 POKE36876 0 NEXTL POKE36878,0 A=
    7900
703 IFPEEK(A)=81THEN710
704 IFPEEK(A)>81THEN162
705 IFPEEK(A)<81THEN162
710 PRINT"[illegible]" E E=E-100 IFE=0THEN2000
711 PRINT"[illegible]" SC SC=SC+50 GOSUB1000
712 GOTO162
1000 X=7680 Y=30720
1001 POKEX+97 42 POKEY+97 42 POKEX+Y+
     97,1 POKEX+98,42 POKEY+98,42
     POKEX+Y+98,1
1002 POKEX+99,42 POKEY+99 42 POKEX+Y+
     99,1 POKEX+119 42 POKEY+119,42
     POKEX+Y+119 1
1003 POKEX+120,42 POKEY+120,42 POKEX+Y
     +120 1 POKEX+121,42 POKEY+121,42
     POKEX+Y+121 1
1004 POKEX+141,42 POKEY+141,42 POKEX+Y
     +141,1 POKEX+142,42 POKEY+142,42
     POKEX+Y+142,1
1005 POKEX+143,42 POKEY+143,42 POKEX+Y
     +143,1
1006 POKE36877,220 FORL=15TO0STEP-1
     POKE36878,L FORM=1TO30
1007 NEXTM NEXTL POKE36877,0 POKE36878,0
1008 FORT=7753TO7759 POKET,32 NEXT
1009 FORG=7775TO7781 POKEG,32 NEXT
1010 FORM=7797TO7803 POKEM 32 NEXT
1012 FORY=7619TO7825 POKEY,32 NEXT
1013 FORL=7841TO7847 POKEL,32 NEXT
1014 GOTO95
     2000 POKE36878,15 FORX=15TO0STEP-.
     3 POKE36880 RND(1)*2+11 POKE36881,
     RND(1)*2+37
2001 POKE36877,160+X FORDE=1TO10 NEXTDE,
     X POKE36877,0 PRINT"[illegible]" POKE36879,8
     GOTO 7000 END
3000 PRINT"[illegible]"
5000 POKE36878,15 FORL=1TO15 FORM=200T
     O220+L*2 POKE36876,M NEXTM NEXTL
5001 POKE36878 0 POKE36876,0
5004 IFV=1THEN162
5006 IFV<>1THEN2000
7000 PRINT"[illegible]"
7001 PRINT"[illegible]YOUR SCORE IS ",SC
7002 FORX=1TO3000 NEXTX
7003 RUN
READY.
```

Star Trek
by Mark Manns

Security

on Ace

This is a program for the Jupiter Ace computer which disables the listing functions. The routines within Forth programs are very easily transferred from one program to another. It is easy to extract a complex routine from someone else's program and then utilise it in your own. Perhaps this is a good idea allowing the wide dissemination of ideas and a pooling of programming knowledge.

However if you have just written some amazing routine which you wish to keep to yourself at the moment then this program should prove useful. It disables *Vlist* and *List* amongst others so that the anatomy of a Forth program cannot be examined. The way it does it is extremely simple: it just provides dummy definitions with the same names as the functioning words and also makes it difficult to edit them out.

When you have written and debugged the program which is to be protected simply type in the security program. Try executing *Vlist* etc and you will see that the only response is an OK printed on the screen.

```
SECURITY PROGRAM

Written for the Jupiter Ace
by Simon Cross. 1983.
```



```
: CALL ;
: EDIT ;
: FORGET ;
: LIST ;
: REDEFINE ;
: VLIST ;
```

Security
by Simon Cross

Letter Writer

on Dragon

This is a letter writing program that uses the computer's ability to handle files in loading or saving letters on cassette.

This program should be very easy to translate for other computers as only the printer commands and file commands will differ. (Chr$(15) sets the printer to single width characters.)

L$(x,y) is the main string variable store.

All £ signs should be typed in as hash signs.

Program notes

20-70	Input the address
210-350	Typing in the letter
390-520	Save the letter on cassette
540-830	Print out the letter
880-970	Loading the letter from cassette

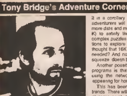
```
* * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                      *
*               LETTER WRITER                          *
*                    BY                                *
*             TIMOTHY BONNELL                          *
*                                                      *
* * * * * * * * * * * * * * * * * * * * * * * * * * * *

10 CLEAR 5000
20 CLS PRINT"input your adress"
30 INPUT"HOUSE NUM&STREET",A1$ A1=LEN(A1$)
40 INPUT"PARISN",A2$ A2=LEN(A2$)
50 INPUT"TOWN",A3$ A3=LEN(A3$)
60 INPUT"COUNTY",A4$ A4=LEN(A4$)
70 INPUT"COUNTRY",A5$ A5=LEN(A5$)
80 PRINT PRINT INPUT"DATE<AN, VERSION> ",A6$ A6=LEN(A6$)
90 INPUT"PENULTIMATE LINE e.9.YUURS FAITHFULLY",A8$ A8=LEN(A8$)
100 INPUT"YOUR NAME",A9$ A9=LEN(A9$)
110 CLS PRINT@64,"YOUR CNUICES ARE"
120 PRINT PRINT"1.USE A LETTER YOU HAVE ALLREADY SAVED ON TAPE"
130 PRINT PRINT"2.TYPE IN A NEW LETTER"
148 PRINT
150 INPUT"WHICH DO YOU WANT",OU$
160 OU=VAL(OU$) IFOU<1ANDOU>2THEN 150
170 ON OU GOTO 880,180
180 CLS PRINT PRINT"    now typ in the letter.dont   worry about split
    words at
the  end of lines ,i will deal with it."
198 PRINT PRINT"   at the end of each Paragraph  ,Press the @  key" '
200 PRINT PRINT"    at the end of the last          Paragraph Press the
    "/"key"
210 FORPA=1TO100
220 FORPP=1TO10
230 FORLE=1TO200
240 Z$=INKEY$ IFZ$=""THEN 240
250 IFZ$="/"THEN 350
260 IFZ$<>"@"THEN 280
270 PRINT PRINT"     ". L$(PA,PP)=L$(PA,PP)+"@" NEXT PA
280 PRINTZ$
290 HH=LEN(L$(PA,PP))-1
300 IFZ$=CHR$(8)THEN L$(PA,PP)=LEFT$(L$(PA,PP),HH)ELSE320
310 GOTO 330
320 L$(PA,PP)=L$(PA,PP)+Z$
330 NEXTLE
340 NEXT PP
350 L$(PA,PP)=L$(PA,PP)+"@"
360 PRINT INPUT"DO YOU WANT TO SAVE THIS ON TAPE [Y/N]",QU$
370 IFQU$<>"Y"ANDQU$<>"N"THEN 360
380 IFQU$="N"THEN 530
390 PRINT"REWIND TAPE"
400 INPUT"AFTER WHICH FILE SHALL I RECORD IT",F$
```

```
410 IFF$=""THEN 440
420 PRINT"PRESS PLAY" SKIPF F$
430 PRINT"STOP TAPE NOW!!!"
440 INPUT"WHAT SHALL I NAME THIS LETTER ",F$
450 INPUT"PRESS PLAY&RECORD AND THEN THE <ENTER> KEY",Q$
460 OPEN "O",£-1,F$
470 FOPLA=1TUPA
480 FOPCB=1TOPP
490 PRINT£-1,L$(CA,CB)
500 NEXTCB,CA
510 CLOSE £-1
520 CLS PRINT@128,"NOW STOP THE TAPE"
530 INPUT"WHAT IS THE NAME OF THE RECIPIENT OF THE LETTER",A7$
540 PPINT£-2,CHF$(15),TAB(76-A1),A1$,","
550 PRINT£-2,TAB(77-A1),A2$,","
560 PPINT£-2,TAB(78-A1),A3$,","
570 PRINT£-2,TAB(79-A1),A4$ ","
580 PRINT£-2,TAB(80-A1),A5$ "."
590 PRINT£-2
600 PRINT£-2,TAB(70-A6),A6$
610 PRINT£-2 PRINT£-2,"DEAR ",A7$ ","
620 A7=LEN(A7$)+6 PA$=STRING$(A7," ")
630 FORLA=1TOPA
640 PRINT£-2,PA$,
650 FORCB=1TO10
660 IFL$(CA,CB+1)<>"" THEN 790
670 F2LAG=1
680 FR=LEN(L$(CA,CB)) PR$=LEFT$(L$(CA,CB),PF-1)
690 PR$=PR$+CHR$(15)
700 FOFI=1TOLEN(PR$)
710 LO$=MID$(PR$,I,1) W$=W$+LO$
720 IFLO$=" "ORLO$=CHR$(15)ORLO$=","ORLO$="."ORLO$="."OR LO$="?"ORLO$="!"ORLO$=" "ORLO$="-"THEN 770
730 NEXT I
740 IF F2=1THEN 760
750 NEXT CB
760 F2=0 PRINT£-2,CHR$(15) NEXT CA GOTO800
770 IFPOS(-2)+LEN(W$)>79THENPRINT£-2
780 PRINT£-2,CHR$(15),W$ W$="" GOTO730
790 PR$=L$(CA,CB)+" " GOTO 700
800 PPINT£-2,CHF$(15) PRINT£-2,CHR$(15)
810 PRINT£-2,CHF$(15),TAB(76-A8),H8$,","
820 PRINT£-2 PRINT£-2 PRINT£-2 PRINT£-2
830 PRINT£-2,CHR$(15),TAB(76-A8),A8$
840 INPUT"WOULD YOU LIKE ANOTHER COPY OF THIS LETTEP [Y/N]",QU$
850 IFQU$<>"Y"AND QU$<>"N"THEN 840
860 IF QU$="Y"THEN 530
870 END
880 INPUT"WHAT IS THE NAME OF THE LETTER ON TAPE",N$
890 CLS PRINT@194,"PLEASE WAIT WHILE I FIND YOUR   LETTER"
900 OPEN"I",£-1,N$
910 FORPA=1TO20
920 FORPP=1TO10
930 INPUT£-1,L$(PA,PP)
940 IF EOF(-1)THEN 970
950 IFRIGHT$(L$(PA,PP),1)="@"THEN NEXT PA
960 NEXT PP
970 CLOSE £-1
980 GOTO530
```

Letter Writer
by T Bonnell

Tony Bridge's Adventure Corner



Fourth generation

We are now playing the 4th generation of text adventures

The first generation included all the original main-frame programs with output being sent to the printer (obviously in text form only — no graphics) The second generation of programs had their text displayed on-screen and supported by admittedly crude, graphics This was the first generation to appear on microcomputers

The third generation featured high resolution graphics and the occasional animated sequence

The current generation as exemplified by *The Hobbit* allows independent action by the characters in the adventure so that while the overall pattern is always similar each game is unique in detail The difference of course between the generations of adventure and the generations of computers is that all the various generations of the game co-exist quite happily and are not mutually exclusive of each other

What will be the future of the game (or hobby as I suppose we should really label it, for that is what it is to many people)? There are software writers who believe that the future of adventuring lies in arcade action Some very good games have been written (see *Ghost Encounters* and the like for the Ataris and *Jumpman* for the Commodore 64 which contain adventure-like problems in an arcade setting) but I get as many people writing to me bemoaning the rise of the arcade adventure and calling for a return to pure text as people asking for a recommendation for a good arcade game

No — I think that arcade adventures will exist and progress alongside the text adventure But, the text adventure itself will evolve I've mentioned *The Hobbit* already as an example of the current state-of-the-art and I think that the next generation will build on techniques seen in this program Thus the inter-reaction between player and character will become more natural and the graphics used to describe each location will reflect the changes in the environment

As bulk storage becomes cheaper as indeed it must over the next couple of years (witness the Microdrives) more and more data will be used by programs in creating life-like scenarios and situations It is a corollary of Parkinson's Law that adventurers will necessarily require ever more data and memory (even unto the nth K) to satisfy their need for ever more complex puzzles to solve and more locations to explore — remember when you thought that 16K would be more than you needed? And now 48K seems a bit of a squeeze doesn't it?

Another possibility for future adventure programs is that of multi-player games using the networking systems that are appearing for home micros

This has been a brief look at present trends There will probably be a revolution at some point to usher in a completely new regime in the adventuring world, and I, for one look forward to being a citizen of the new state of affairs

If you've thought about this and have your own ideas about how adventuring may evolve write and let me know — the best vision of the future may even win a small prize (so state your computer when you write)

Valhalla — mentioned in this column some weeks ago, this program is apparently going to set the world alight OK I know you've heard all that before, but some of the screen shots that I've seen do point at something a little out of the ordinary At the time of writing the advertised release date has come and gone But, by the time you read this, we should have seen something of the program itself And as this program by dint of its publicity if nothing else, seems to be an important successor to *The Hobbit*, I'll keep you posted of any news

Now we descend to the basements of those business institutions where the huge mainframes are kept busy far into the night — do we find the employees slaving away at Mammon's balance books? No we do not — they're all playing adventure on the company mainframe at £60 a minute!

A lot of people have written to me to tell me that their introduction to the world of adventure was via a PDP or IBM machine on which they would toil after working-hours, trying to solve the mystery of the plover room or the use for the black rod Keith Brown for instance writes to tell me of an adventure program called *Dungeon* which he played on a VAX mainframe some time ago This was the one with a house by a river and a trapdoor beneath a rug in the lounge Keith would like to know if this is commercially available

You don't tell me Keith what machine you have now but there are many implementations of the original mainframe adventure programs for most of the modern home micros Level 9 for example have a good range of similar games for the BBC Spectrum and Nascom machines Any Scott Adams program for the Commodores and Atari micros will also have the flavour of those mainframe games as will the Digital Fantasia series of text adventures which are available for the Atari and Spectrum

More about mainframe adventures next week In the meantime *don't ask a computer to play global thermonuclear war*

This series of articles is designed for novice and experienced Adventurers alike Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter So if you have an Adventure you want reviewed or if you are stuck in an Adventure and cannot progress any further write to Tony Bridge Adventure Corner *Popular Computing Weekly* 12-13 Little Newport Street London WC2R 3LD

Are you stuck in an adventure? Are you faced by a problem that seems insurmountable? *Adventure Helpline* may be the answer

Adventure Helpline is quite simply designed to put adventurers in touch with one another Where you may be stumped by a baffling puzzle a fellow adventurer may be able to help By the same token you may be able to help other people with their problems

If you are having difficulties with an adventure fill in the accompanying coupon and send it to

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We shall publish *Adventure Helpline* entries each week in their own special column

Adventure Helpline

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COMPUTER STUDIES

Paul Silverman of Adelaide Road Hampstead London writes

Q I am interested in taking a GCE 'O' level in computer studies and wondered whether you have any information on the syllabus or of any correspondence courses or classes available. I am very knowledgeable about computers but would obviously have to study to pass the exam

A The place to find the answer to your question is your local library which should have copies of the various syllabuses

I would suggest however that you find a course before you look for a syllabus as the requirements differ from board to board and you will need to know which board you are attempting before you can get to grips with an individual syllabus You might like to try night school or an adult education centre — as a rule if 12 to 15 people want to do a specific course then they will do their best to try and organise one

HALF A K

Dennis Trane of Cheshire Road London NW10 writes

Q I am a little confused as to how the 2114 chip works I know that a pair of them will give you 1K of memory, but according to a friend a single one will not give half a K of memory Yet I can remember some years ago, when I first considered buying a home computer, some micros had only a quarter or half a K of memory How does a chip like the 2114 work?

A To explain how a 2114 worked would take several chapters of background to micro electronics Essentially your friend is correct in that a single 2114 will not give you 512 bytes This because it has only four data lines If we had a computer that had four bits to the byte instead of the 8 we are used to seeing, then a single 2114 would give 1K bytes

Instead what a single 2144 does is give 4 by 1024 bits not 8 by 512 even though the total number of bits is the same The important fact to look out for is how those bits are distributed, and that means looking at the number of data lines available Because of this a pair of 2114s are needed to give 1K of 8 bit bytes because only a pair or multiples thereof, will supply sufficient data lines If we were using a 16 bits to the byte computer then it would take four 2114s to make 1K bytes

TEXAS PROGRAMS

Neil Swift of Widnes Cheshire asks

Q Why is it there are not more programs available for the excellent Texas machine?

A I think it's improving After three years and a drop in price of some 70 per cent there are signs that the TI computer is beginning to sell in sufficient quantities to interest independent manufacturers

While there are still few programs on the market I would expect to see some material available by the time of the Barbican show (September 28-October 2) I do hope that the planned introduction of patented hardware for the computer does not hinder this development otherwise the computer might slip back into its undeserved obscurity

TRAIN CONTROL

Mark Metcalf of Altmore Avenue East Ham London E6 writes

Q I am looking for a suitable I/O port to let my ZX Spectrum control a Hornby train set The maximum number of trains running at the same time is nine.

A The only two ports that I can think of that might help you both use the 8255 chip which gives you 24 control lines One is by Kempston the other by Eprom Services The latter has changeover lines that will make it easier for you to monitor the signals You will also have to make sure that you have a stackable connector, ie, the sort of motherboard that leaves you with a complete edge connector after your port is in place

LOOP THE LOOP

S D Robbins of Menear St Austell Cornwall writes

Q I have a program that allows you to enter variable data into a *For/Next* loop, string array The *Dim* statement is *Dim A$ (19,32)* A *Gosub* statement will let you come out or go into the loop on each count, without losing data

Can I manually come out of the loop at any time do work at any part of the program, and then return to the loop on the count I left it on? All this would be done, of course, while the program was running.

A This is a very difficult question for me to answer because I do not know what computer I am dealing with (at least one person a week still forgets to tell me this and it is not always possible to work it out) Fortunately in this case, the general rules are similar for most of the common home computers

Essentially, if you do not change the value of the variable that controls the loop then it will retain the value it had when you came out of the loop to work on the other section of the program What happens on most computers is that when you go back to the loop, a few extra bytes of garbage will be taken into the *Gosub* stack with it So if you do this several times there will be a risk of filling up the *Gosub* stack, which is likely to cause a systems crash (the ZX computers get round this by transferring the values into the variables automatically)

To get round the problem on other computers before starting work on another section of the program set a new variable to the current value of your loop So if you have a loop say *For N = 1 to 19* and you come out after 10 loops set *Let Z = N* and then when you come back you can work on a loop *Z to 19*

One thing to beware of is that when you return to the loop you do not go back to the line that sets it eg *10 For N = 1 to 19* if you go back by a command such as *Goto 10* then you will of course reset the value of *N* and lose the place you have tried so hard to keep

GENIE CONVERSION

Andrew Moore of Priory Road Blidworth Notts writes

Q I am writing to you about my computer which is an EG2000 Colour Genie. I tried a few of your programs, but they were not successful when I tried to convert them Couldn't you include more programs for Genie owners?

A The Genie, like the Tandy Colour computer has suffered badly with the introduction of the Dragon which apparently offers similar facilities at a cheaper price The main reason we do not deal with the Genie is that we do not get any material submitted for it'

One development that you might find useful is the Colour Genie Users Group which has recently been formed with the help of the National TRS80 users group They have started to publish a magazine called *Chewing Gum* which is devoted to the Genie You can get further details from Colour Genie Users Group 46 Highbury Avenue Bulwell Nottingham NG6 9DP

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, 12-13 Little Newport Street, London WC2R 3LD.

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COMPUTER SWAP

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CRUISING & BLIND ALLEY

Cruising

The winner of this month's competition with a score of 43552 was Carl Doran of Skidby Mill North Humberside Entries for this month's competition close on September 30

Blind Alley

The winner of this month's competition with a score of 99955 was I Wilson of Thornaby Stockton Entries for this month's competition close on September 30

NEW RELEASES

TWISTED

J K Greve Enterprises was once the home of Malcolm Evans who went on to found New Generation Software

Since his departure little has been heard of the company — until now

The new release is a sort of 3D Ground Attack called *3D Vortex*. You must guide your craft along the twisting and turning Vortex avoiding the sides and the various strange life forms that lurk there

Claimed features of the game include quality 3D graphics and high speed machine-code animation. The game is compatible with most types of joysticks

Program *3d Vortex*
Price £5.95
Micro *Spectrum 48K*
Supplier *JK Greve Enterprises*
16 Park Street
Bath
Avon BA1 2TT

OVERTONES

Harrier Attack is a high speed machine code game for the Oric. Your task is to take off from the deck of an aircraft carrier and fly to a designated target without getting shot down

Assuming you manage to avoid the enemy's defences you then have to bomb the enemy base and finally fly back to the carrier without running out of fuel

There is a choice of skill levels and the game appears to be basically *Scramble* with overtones of *Flight Simulation*

Program *Harrier Attack*
Price £6.95
Micro *Oric 1*
Supplier *Durell Software*
Castle Lodge
Castle Green
Taunton TA1 1AB

3 PARTS

Pearl Harbour is a fairly epic sounding game for the 48K Spectrum — in three parts

In the first part you control the movement of three squadrons over a high resolution map and attempt to intercept five Japanese squadrons moving towards their target

Assuming you can find them the screen changes to show the view from the cockpit of a P40 fighter and it's up to you to shoot down the Zeros before they reach their destination

The final section puts you on the deck of a ship moored in Pearl Harbour and planes swoop down intent on your destruction. Since true to history your destruction is the most likely occurence the best you can hope for is a place on the high scores hall of fame

Program *Pearl Harbour*
Price £5.95
Micro *Spectrum 48K*
Supplier *Sabresoft*
13 Bower Avenue
Hazel Grove
Stockport
Cheshire

CONVERTER

There is as every Dragon owner knows a close similarity between the Dragon and the Tandy Colour Computer. The problem is that no one has been quite sure just how close that similarity has been, ie do you risk going out and buying tapes for the other machine on the off-chance they will work on yours?

Although the Tandy isn't a big seller here in America it has sold well and ensured a large software backup. Obviously Dragon owners would like to have access to all those games

One enterprising solution to the problem is *Dragon Cruncher* from Elkan Electronics. This converts programs from one machine to the other — provided they are written in Basic. A version which will handle machine code is expected soon

Program *Dragon Cruncher*
Price £7.95
Micro *Dragon 32 Tandy Colour*
Supplier *Elkan Electronics*
Freepost 11
Bury New Road
Prestwich
Manchester M25 6LZ

MONITOR

What every budding machine code programmer needs is a monitor. Kenema Associates claims of course that its Oric monitor is the best

Facilities include breakpoint display, full hexadecimal arithmetic, hex and disassembly display, register display and modification and various kinds of search

Program *Oric 1 Extension Monitor*
Price £15
Micro *Oric 1*
Supplier *Kenema Associates*
1 Marlborough Drive
Worle
Avon BS22 0DQ

LESSONS

Rose Software has issued a number of programs concerned with education on the Spectrum

The latest is *Young Learners 1* which contains four programs — *Abacus*, *Telling the Time*, *Shopping* and *Snakes and Ladders*

Program *Young Learners 1*
Price £5.95
Micro *Spectrum 16-48K*
Supplier *Rose Software*
148 Widney Lane
Solihull
West Midlands
B91 3LH

IMPOSSIBLE

The Impossible is the title of a puzzle so difficult that most people claim that it is ... well impossible

This turns out to be a computer version of that old school maths puzzle where you have to connect three houses with gas, water and electricity without letting any of the lines (pipes) cross

It would be unfair of me to say whether the task was possible or not but it is certainly not straight forward

The program runs on any Spectrum and, of course your machine will not allow you to cheat

Program *The Impossible*
Price £5.45
Micro *Spectrum 16-48K*
Supplier *D J Mutch*
Farm Cottage
28 The Street
Barton Mills
Bury St Edmunds
Suffolk IP28 6AW

SORCERY

Vortex Software is well known for its *Android 1* program which was in the classic high tension arcade game format

However the company has also moved into adventures with *Serpent's Tomb* — initially for the ZX81 but soon for the Oric and Spectrum

The aim of *Serpent's Tomb* is to retrieve a shield from the depths of an ancient structure. Part one is the story of Xetros with the main adventure forming part two. Xetros it seems lost the shield in the first place

The game features 25 chambers on two levels, a vast maze, a large vocabulary and all the appropriate trappings of swords, sorcery, magic and demons

Program *Serpent's Tomb*
Price £3.95
Micro *ZX81 16K*
Supplier *Vortex Software*
76 Crawford Road
Hatfield
Herts AL10 0RG

NEW RELEASES

UTILITY

Base Two Software has two useful utility programs on one cassette *Fill* will fill in any shape you create via a machine code routine that can be called from your own programs

Compressor does just what it implies ie it compresses the screen of your Spectrum — the advantage of this is the amount of memory you can save The author claims this can be up to 3 7K on some programs

Program *Fill/Compressor*
Price *£3 75*
Micro *Spectrum 16/48K*
Supplier *Base Two Software*
9 The Copse
Lindfield
Sussex

MUSIC SHAPE

BBC-owning Bach fans — and I m sure there are many — will be most interested in a new program from Compusoft

Toccata — as its name suggests — simply plays Bach s famous organ work with an accompanying moving picture showing the shape of the music

If it all sounds a bit passive for the average *Space Invader* fan it s worth pointing out that it comes for a very sensible price — £2 99

Program *Toccata*
Price *£2 99*
Micro *BBC*
Supplier *Compusoft*
32 Watchyard Lane
Formby
Nr Liverpool
L37 3JU

LOSERS . FOREIGN BUG

Typical, I go abroad, don't pick up anything, come Home - and my Computer has a Nasty Bug

HIGHEST SCORE

by Steve May

BUSINESS

With the advent of the microdrive, the idea that the Spectrum can be used as an effective business machine may gain more credence If it does, then the software packages that are already available for the Spectrum will represent very good value for money

A case in point is Kemp s *Sales Ledger* which at least according to the blurb does what a business package costing £150+ would do on a serious machine

The idea of the program is to provide a day-to-day record of outstanding accounts for the small business

The program can find any record in two seconds The eight menu options allow for five alterable VAT rates and a print out of all accounts and statements

Program *Sales Ledger*
Price *£14 95*
Micro *Spectrum 48K*
Supplier *Kemp*
43 Muswell Hill
London N10 3PN

FULL COLOUR

Spectrum
Maziacs

Aficionados would say that *Mazogs* was one of the best five games on the ZX81

Doubtless there are many people who have moved from the ZX81 to the Spectrum but who still sneak back to its predecessor for a venture into the *Mazogs* maze But sadly, they may venture no more because *Mazogs* is now available on the Spectrum

The little man steps boldy into the maze once more battling the dreaded *Maziacs* (more vicious relatives of *Mazogs*) and searching for the treasure at the heart of the maze — this time with full colour and sound

Program *Maziacs*
Price *£6 95*
Micro *Spectrum 48K*
Supplier *DK'Tronics*
Unit 2
Shire Hill
Industrial Estate
Saffron Walden
Essex CB11 3AX

FIG-FORTH

So far as versions of Forth go the Spectrum is well supplied with about half a dozen to choose from

But what of the Dragon? Here is a machine that could certainly benefit from Forth s speed and flexibility (it might improve the quality of some of the software] Well you may not have noticed but there are four versions around

One of the more visible (well I ve seen it) comes from M & J Software — initially a 32K cassette version with 64K disc and cassette versions to follow

Unlike some of the Spectrum versions of Forth there is a definite intention by the company to produce as close a version of fig forth as possible

Although an extensive manual is included it is stressed that this manual is not intended for beginners — more as a technical reference guide

Program *Dragon fig forth*
Price *£10 (cassette)*
Micro *Dragon 32*
Supplier *M & J Software*
34 Grays Close
Scholar Green
Stoke on Trent
ST7 3LL

PACKAGED

If you are a small business that owns a BBC it s possible you would not baulk at the idea of paying £59 95 plus VAT for a series of business packages on disc — some versions for big " computers cost three times that

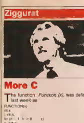
HCCS has various disc based programs for *Invoicing Payroll Stock Control Order Processing* etc

The *Integrated Invoicing* and *Sales Ledger* allows for printing and input of invoices with calculation of discounts and VAT maintenance of the sales ledger cash allocation, printout of sales statement invoice analysis, etc

Program *Integrated Ledger*
Price *£59 95*
Micro *BBC (Twin Disc)*
Supplier *HCCS*
27 Market Square
Biggleswade
Beds SG18 8AS

New Releases is designed to let people know what software is coming on to the market If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases Popular Computing Weekly 12 13 Little Newport Street London WC2R 3LD

Ziggurat



More C

The function *Function (x)*, was defined last week as

```
FUNCTION(x)
int x
{ int p;
for (p = 1 ; x > 0 ; x--)
p=p*x
return(p)
}
```

and I asked you to think what it might mean. It is in fact the factorial function, and calculates the factorial of *x*.

The function is a *Function* with one parameter *x*, and *x* is declared as an integer. If there are no arguments there are no declarations.

Within the body of the function (ie between { and }) a local variable *p* is declared as another integer. A local variable is not recognised outside the function. The variable is used in the loop which follows the declaration. Another way of writing the loop is

```
p = 1
while (x >0) {p = p*x ; --x }
```

This says let *p* equal to 1, while *x* is greater than zero let *p* become equal to *p* times *x* and decrement the value of *x* by 1. The factorial is calculated in variable *p*.

Another loop variant is

```
p=1
do {p=p*x ; --x }
while (x>1)
```

the difference being that the loop always executes once, even when *x* = 1. Even if *x* is initially zero it still executes. After the loop has ended, the value of *p* is returned as the value of the function.

C has many nice little touches such as ++ or -- meaning increment or decrement by 1: ++*x* is the same as *x*=*x*+1.

Like *BCPL* before it --*c* has many flexible control structures. The simple conditional is

```
if (test) statement else statement 2
```

And there is a "switch" conditional which chooses from a series of alternatives (and includes a default if the alternative is not explicitly included). There is a further useful conditional

```
z=(x<y)?x:y
```

which will place the lower of two values in the variable *z*.

There is a *Goto* statement in *C*, only operative within a function.

```
if (disaster) goto errorlabel
```

Code involving a *Goto* can always be written without one, though perhaps at the price of some repeated tests or an extra variable.

Functions break large computing tasks into smaller ones, and enable collaboration between users. Appropriate functions can often hide details of operation from parts of the program that do not need to know about them.

In Forth one is able to give new names to existing words. In *C* this is taken further. *C* has what is called "macro" substitution. That is, whenever a certain macro name is encountered in the program, the name is replaced by the exact supplied code.

```
#define min(x, y) ((x) <(y) ? (x) : (y))
```

When the line

```
a=min (b, c)
```

is encountered, it will be replaced by the line

```
a=((b)<(c)?(b) : (c))
```

Just like that. The line will then be compiled normally. min (*x*,*y*) is not a call to a function. It is a straight substitution of code.

All sensible systems languages have powerful methods of using pointers, and the ability to concoct powerful methods of describing data. *C* is probably as powerful as Algol 68 in this respect.

The C Programming Language by Kernighan and Ritchie (mentioned last week) must be one of the very few books on programming languages which sparkle. Like any other language, *C* has its blemishes. Some of the operators have the wrong precedence. Some parts of the syntax could be better. And there are several versions of the language extant, differing in minor ways.

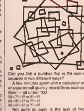
I leave *C* with that honesty. ■

Boris Allan

Puzzle

Square's square

Puzzle No 71



Can you find a number that is the sum of two squares in two different ways?

A few minutes spent with a calculator or table of squares will quickly reveal three such possibilities — all under 100:

$50=7^2+1^2$ or 5^2+5^2
$65=8^2+1^2$ or 7^2+4^2
$85=9^2+2^2$ or 7^2+6^2

Not quite so easy is the task of finding a number — the smallest possible — that is the sum of two squares in *three* different ways.

Can you solve it?

Solution to Puzzle No 68

In the program *N* is the number of wotzits. Line 30 eliminates impossible values of *N*. *P$* is the number of packages, and *D* is the number of wotzits per package.

```
10 LET N=10
20 LET N$=STR$ N
30 IF N$(LEN N$)="0" THEN GOTO 110
40 LET P$=""
50 FOR M=1 TO LEN N$
60 LET P$=N$(M)+P$
70 NEXT M
80 IF VAL P$>=N THEN GOTO 110
90 LET D=N/VAL P$
100 IF D=INT D=0 THEN PRINT N, D
110 LET N=N+1
120 GOTO 20
```

This gives answers: 8712 wotzits in 2178 packages each containing 4 wotzits. Although 9801 wotzits in 1089 packages of 9 wotzits is also a solution, it has the smallest number of packages of any solution, *not* the smallest total number of wotzits.

Winner of Puzzle No 68

The winner is K J Wain, Darlington Avenue, Woodley, Reading, who receives £10.



Top 10

Atari

1	(—)	Suspended	(Infocom)††
2	(2)	Miner 2049er	(Big Five)*
3	(—)	Deadline	(Infocom)††
4	(—)	Ultima II	(Sierra On-line)††
5	(—)	Star of Sisyphus	(Adventure International)†††
6	(—)	Zaxxon	(Datasoft)
7	(4)	Combat Leader	(SSI)††
8	(—)	Wayout	(Sirius)††
9	(—)	Gridrunner	(Llamasoft)
10	(10)	The [illegible]	(Sirius)††

*Cartridge †32K Disc, ††48K Disc
(Figures compiled by Micro Management, Ipswich 0473 59181)

Vic20

1	(1)	Arcadia	(Imagine)
2	(2)	Wacky Waiters	(Imagine)
3	(4)	Sargon II Chess	(Commodore)
4	(7)	Catcha Snatcha	(Imagine)
5	(5)	Panic	(Bug-Byte)
6	(6)	Skyhawk	(Quicksilva)
7	(10)	Cyclons	(Rabbit)
8	(—)	English Invaders	(Rabbit)
9	(9)	Escape MCP	(Rabbit)
10	(—)	Gridrunner	(Llamasoft)

*Cartridge
(Figures compiled by Boots & Co, London)

ZX81*

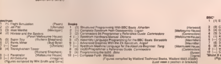
1	(1)	Space Raiders	(Psion)
2	(2)	Espionage Island	(Artic)
3	(6)	Football Manager	(Addictive Games)
4	(3)	Flight Simulation	(Psion)
5	(7)	1K Games	(Artic)†
6	(10)	QS Scramble	(Quicksilva)
7	(8)	Defender	(Quicksilva)
8	(—)	1K Chess	(Artic)†
9	(—)	[illegible]	(Macronics)
10	(9)	Fantasy Games	(Psion)

All 16K except where shown. †Runs in 1K.
(Figures compiled by Boots & Co, London)

Dragon

1	(1)	The King	(Microdeal)
2	(2)	Space War	(Microdeal)
3	(3)	Talking Android Attack	(Microdeal)
4	(5)	Night Flight	(Salamander)
5	(7)	Dragon Trek	(Wintersoft)
6	(4)	Frogger	(Microdeal)
7	(8)	Champions	(Peaksoft)
8	(8)	Planet Invasion	(Microdeal)
9	(—)	Graphics System	(Salamander)
10	(—)	Ring of Darkness	(Wintersoft)

(Figures compiled by Boots & Co, London)



Spectrum

1	(1)	Flight Simulation	(Psion)
2	(2)	Jet Pac	(Ultimate)
3	(3)	Mad Martha	(Mikrogen)
4	(6)	Horace and the Spiders	(Psion/Melbourne House)
5	(5)	Super Spy	(Richard Shepherd)
6	(7)	Manic Miner	(Bug-Byte)
7	(—)	Pssst	(Ultimate)
8	(4)	Transylvanian Tower	(Richard Shepherd)
9	(—)	Penetrator	(Melbourne House)
10	(—)	Ah Diddums	(Imagine)

(Figures compiled by WH Smith and Sons)

Books

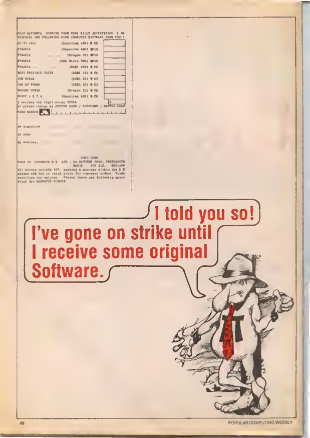
1	(3)	Structured Programming With BBC Basic *Atherton*	(Horwood)
2	(1)	Complete Spectrum ROM Disassembly *Logan*	(Melbourne House)
3	(2)	Commodore 64 Programmer's Reference Guide *Commodore*	(Commodore)
4	(—)	Spectrum Hardware Manual *Dickens*	(Melbourne House)
5	(7)	Assembly Language Programming for the BBC Basic *[illegible]*	(Macmillan)
6	(—)	Advanced Graphics With the ZX Spectrum *Angell*	(Macmillan)
7	(—)	Spectrum Machine Language for the Absolute Beginner *Tang*	(Melbourne House)
8	(6)	Vic20 Programmer's Reference Guide *Commodore*	(Commodore)
9	(4)	Programming the 6502 *Zaks*	(Sybex)
10	(—)	Complete Forth *Winfield*	(Sigma)

(Figures compiled by Watford Technical Books, Watford 0923 23384)
(Last week's position in brackets)

BBC*

1	(1)	Escape from Moonbase Alpha	(Program Power)
2	(9)	Countdown to Doom	(Acornsoft)
3	(4)	Danger UXB	(Program Power)
4	(3)	Super Invaders	(Acornsoft)
5	(1)	Killer Gorilla	(Program Power)
6	(—)	Great Britain Ltd	(Simon Hessel)
7	(6)	Snooker	(Acornsoft)
8	(8)	Alien Swirl	(Program Power)
9	(—)	Wordwise	(Computer Concepts)†
10	(—)	Chess	(Program Power)

*Model B only †Rom.
(Figures compiled by Micro Management, Ipswich 0473 59181)



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